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ERRATA.

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IMPERIAL BUREAU OF ENTOMOLOGY.

REVIEW
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SERIES B.

VOL. XIII.] [1925.

POWER (W. M.). **The Problem of East Coast Fever.**—*Jl. Dept. Agric. Union S. Africa*, ix, no. 4, pp. 306–310. Pretoria, October 1924.

The dipping of cattle at short intervals, with the additional precaution of hand-dressing the animals, is considered essential in controlling African coast fever. Regular dipping has greatly improved conditions in Natal Province, but can only give the best results if carried out before infection gains entrance; if infection has become established in a locality where ticks are numerous, heavy mortality occurs before the disease can be checked, especially in the low-lying parts, where conditions are favourable to tick development. Where dipping and hand-dressing every five days are regularly practised with suitable tanks, the disease is kept well in hand. The usual dipping material is pure sodium arsenite at a strength of 80 per cent. arsenious oxide.

The chief measures necessary for the prevention and eradication of African coast fever are summarised as follows:—Efficient dipping and hand-dressing; early diagnosis, for which blood-smears from sick and dead cattle should be forwarded immediately for examination; suitable tanks, kraals and crush-pens, maintained in good repair; fencing; isolation of sick cattle; and control of all cattle on a farm, tenants' cattle included.

Sheep Maggot Fly Investigations.—*Jl. Dept. Agric. Union S. Africa*, ix, no. 5, pp. 384–385. Pretoria, November 1924.

The results obtained from circularising farmers are summarised, showing that in most parts of the country blowflies have been known for many years, in some instances as many as 30 years, and that the pest is apparently becoming more serious. Most of the trouble occurs between the 1st October and the end of April (during the summer), the warm rainy or misty weather encouraging the flies to attack the sheep. Diseased sheep are apparently more liable to attack than are healthy ones, though the latter are by no means immune. There is considerable difference of opinion as to what type of country is most frequented

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by the flies, the majority however believing that sheep running near rivers and dams, particularly where there is bush or long grass, are more persistently attacked than those running on high open veldt. It is generally agreed that the disposal of carcasses is a very important means of checking the increase of flies.

MENÉNDEZ RAMOS (R.). **El *Melinitis minutiflora* y la garrapata.** [*M. minutiflora* and Ticks.]—*Rev. Agric. Puerto Rico*, xii, no. 4, pp. 219–223, 2 figs. S. Juan, P.R., April 1924. [Received 27th November 1924.]

Trials made at the Insular Experiment Station show that "molasses grass," *Melinitis minutiflora*, does not destroy ticks, *Boophilus* (*Margaropus*) *annulatus australis*, Fuller, but that it repels them. In a pasture sown exclusively with it, and where no other plants of about the same height occur, ticks that fall from animals are likely to die through being unable to reach new hosts. *M. minutiflora* should therefore be of value in enclosures, but even if cattle become accustomed to it, its yield as forage is inferior to that of other grasses readily eaten by the animals.

[OLENEV (N. O.).] **Оленев (Н. О.). К биологии скотского клеща (*Ixodes ricinus* L.) в условиях Новгородской губ.** [On the Biology of *I. ricinus* under Novgorod Conditions.]—**Защита Растений от Вредителей** [*Plant Protection*], i, no. 1–2, pp. 36–41, 2 figs., 2 maps. Leningrad, October 1924.

A great many cattle suffer from piroplasmosis in Russia, the incidence of the disease being in direct relation to the prevalence of the tick, *Ixodes ricinus*, L. Maps are given illustrating the amount of infestation in various localities of Novgorod, the climatic conditions of which are also discussed. The influence of temperature and humidity on the time of development of the eggs of the tick must necessarily also influence the prevalence of the disease in the various localities. Whereas under certain natural conditions the eggs took 8 weeks to develop, only 3 weeks were required under artificial conditions at an average temperature of 25–30° C. [77–86° F.]. Eggs were killed at a humidity of 50 to 80 per cent.

LEBAILLY (C.). **Les mouches ne jouent pas de rôle dans la dissémination de la fièvre aphteuse.**—*C. R. hebdom. Acad. Sci.*, clxxix, no. 21, pp. 1225–1227. Paris, 1924.

Cattle infected with foot-and-mouth disease were placed in a stable next to one containing cattle free from the disease, a small opening covered with wire mesh being made between them. Numbers of *Muscina stabulans*, Fall., and *Musca domestica*, L., were introduced into both stables, where they passed freely from one to the other. Five such experiments, each lasting 15 days, were carried out during the months June to September, and it was found that in no case did the healthy cattle become infected, whence it may be concluded that flies play no part in the dissemination of the disease.

MAGYARY-KOSSA (J.) **Beiträge zur Behandlung der Gastrophiliasis beim Pferde.** [Contributions to the Treatment of *Oestrus* in the Horse.]—*Közlemények az összehasonlitó élet-és kórtan köréből.*, xvi, p. 169, 1924. (Abstract in *Deutsche tierärztl. Wochenschr.*, xxxii, no. 43, p. 659. Hanover, 25th October 1924.)

A preparation of benzol containing isothiocyanallyl and put up in capsules is recommended as an effective and harmless specific against the larvae of *Oestrus* (*Gastrophilus*) infesting the stomach of the horse.

SELLNICH (—). **Ein Beitrag zur Behandlung der Gastrophiliasis der Pferde mit Chlorkohlenstoff (Carbon. tetrachlorat).** [A Contribution to the Treatment of *Oestrus* in Horses with Carbon Tetrachloride.]—*T.R.*, 1924, p. 311. (Abstract in *Deutsche tierärztl. Wochenschr.*, xxxii, no. 44, p. 673. Hanover, 1st November 1924.

Carbon tetrachloride is recommended for use against the larvae of *Oestrus* (*Gastrophilus*) infesting the stomach of the horse.

PACCHIONI (G.). **Sull' Ipodermosi bovina (con speciale riguardo ai gravi danni che arreca ed di necessari mezzi di lotta in Italia).** [On the Infestation of Cattle by *Hypoderma*. With special Notice of the severe Losses caused and of the combative Measures necessary in Italy.]—*Allevamenti*, v, nos. 9 & 10, pp. 136–139, 146–150, 7 figs. Palermo, September & October 1924.

In view of the losses, estimated at 5½–7 millions of lire per annum for the hides alone, caused in Italy by *Hypoderma bovis*, DeG. and, to a less degree, by *H. lineatum*, Vill., this paper has been prepared from existing data on the pests in order to direct attention to the subject of control. At the present time there are in Italy no associations for combating *Hypoderma* such as exist in other countries.

KENNARD (D. C.). **Chicken Lice and Mites.**—*Mthly. Bull. Ohio Agric. Expt. Sta.*, ix, no. 5–6, pp. 100–104, 2 figs. Wooster, Ohio, May–June 1924. [Received 14th November 1924.]

The treatment of poultry for the control of external parasites is discussed. For the eradication of lice, the method of dipping in a solution of 1 oz. sodium fluoride per gallon of luke-warm water is described, or, as an alternative, dusting; and for mites the thorough disinfection of fowl-houses with oil sprays is explained.

ASKINS (R. A.). **Dermatitis caused by** *Pediculoides ventricosus*.—*Brit. Med. Jl.*, no. 3334, p. 950. London, 22nd November 1924.

The mite, *Pediculoides ventricosus*, Newp., is recorded as causing dermatitis among dock labourers at Bristol engaged in unloading barley from Morocco. On microscopic examination of the barley only females were found. The mite does not burrow under the skin, nor does it persist long on the human body, and it shows little tendency to spread from one person to another, though dust blown from the barley will apparently carry it, and so cause the disease. Soothing ointments

and bathing with warm water containing soda are recommended and, as a preventive, smearing the exposed parts with grease, followed by a bath after work.

SJÖSTEDT (Y.). **Tsetseflugorna och sömnsjukan.** [Tsetse-flies and Sleeping Sickness.]—*Kungl. Svenska Vet. Akad. Årsbok 1923*, pp. 253–279, 13 figs. Stockholm, 1923.

This article is a general review of the *Glossina* problem in relation to sleeping sickness.

BEQUAERT (J.). **Description de deux Pangoniines (Tabanides) nouvelles du Bas-Congo.**—*Rev. zool. afr.*, xii, no. 4, pp. 461–468. Brussels, 1st November 1924.

The new species described from the Belgian Congo are *Pangonia rodhaini* and *Nuceria mayombensis*, both described from females. A key is given to the genera of the subfamily PANGONIINAE of the Ethiopian region.

ISAAC (P.V.). **Papers on Indian Tabanidae. i. A Practical and Simple Method for rearing Tabanid Larvae. ii. The Number of Moults in Tabanid Larvae. iii. The Life-history of *Tabanus crassus*, Walker, and the Identity of the Female of the Species.**—*Mem. Dept. Agric. India*, Ent. Ser. viii, no. 5, pp. 53–62, 4 pls. Calcutta, August 1924. [Received 24th November 1924.]

In the first of these papers, an improved method of rearing Tabanid larvae is described and illustrated, the larvae being isolated in glass beakers containing clean sand and fed on Muscid larvae.

As a result of observations made possible by this method, it was found that Tabanid larvae moult seven times, instead of three, as previous writers have recorded; this was found true for *Tabanus rubidus*, Wied. (*albimedius*, Wlk.); *T. striatus*, F. (*hilaris*, Wlk.) and *T. tenens*, Wlk. In the case of *T. crassus*, Wlk., eight larval moults occur.

In the third paper, the life-history is described of *T. crassus*, one of the largest Tabanids found in India. Its habits are unknown, though it is very probable that the female sucks blood from vertebrates. The stages are described. The incubation period is thought to be 5 to 7 days; the newly-hatched larva moults immediately upon falling into water, and the second-instar larva sinks and crawls into moist sand at the water's edge. The larval stage in summer occupies about 15 weeks; the pupal period, passed in damp sand, lasts about 18 days. There are three generations at Pusa, from March to June, from June to October and from October to March, hibernation in this generation being in the larval stage. A Scelionid parasitises a large percentage of the eggs. From the rearings at Pusa, authentic females of *T. crassus* have been obtained, these agreeing with *T. sanguineus*, Walk., of which only females are known; as the former name has priority, *T. sanguineus* therefore becomes a synonym.

DALLA TORRE (C. G.). **Aphaniptera orbis terrarum (Synopsis praecursoria).**—*Ber. naturw. med. Vereines Innsbruck*, xxxix, pp. 1–29. Innsbruck, 1924.

This is a useful list of the fleas of the world.

EWING (H. E.). U.S. Bur. Ent. **A Collection of Fleas from the Island of Hawaii.**—*Proc. Ent. Soc. Washington*, xxvi, no. 8, pp. 209–210. Washington, D.C., November 1924.

All the fleas occurring in Hawaii are apparently introduced and are of economic importance. They comprise : *Pulex irritans*, L., from dogs ; *Xenopsylla cheopis*, Roths. (oriental rat flea) from various rats ; *Ctenocephalus felis*, Bch. (cat flea) from dogs, mongoose and cats ; *Leptopsylla segnis*, Schönh. (*Ctenopsylla musculi*, Dugés) (mouse flea) from mice and rats ; and *Echidnophaga gallinacea*, Westw. (stick-tight flea) from mongoose and dogs.

BAERG (W. J.). **The Effect of the Venom of some supposedly poisonous Arthropods.**—*Ann. Ent. Soc. America*, xvii, no. 3, pp. 343–352, 7 figs. Columbus, Ohio, September 1924.

The effect of the venom of various centipedes and scorpions is described as a result of experiments on man and rats.

MARTINI (E.). **Culiciden-Beobachtungen 1922, 1923.** [Observations on Culicids in 1922, 1923.]—*Zeitschr. angew. Ent.*, x, no. 2, pp. 436–447. Berlin, October 1924.

This paper contains faunistic records, mainly from Germany, but also from Austria and Denmark.

In March the author observed a swarm of females of *Theobaldia alaskaensis*, a circumpolar species, near Hamburg, and succeeded in obtaining eggs and larvae from them. *T. glaphyroptera* is recorded from Lower Austria. This is apparently a hill mosquito, chiefly found in eastern Europe, though it has been recorded in Alsace and Thuringia. *T. annulata* var. *ferruginata* n., is described from near Hamburg.

Species of *Aëdes* recorded from various localities in Germany are : *A. punctor meigenanus* ; *A. pullatus jugorum* (*gallii*), often associated with *A. punctor meigenanus* in the Black Forest ; *A. detritus* (*salinus*) bred from saline water inland ; *A. rostochiensis* ; *A semicantans* ; *A. freyi*, from near Berlin ; and *A. diantaeus* and *A. intrudens* from East Prussia, the latter being the first German record of this species.

Anopheles plumbeus (*nigripes*) (larvae and adults) was taken near Freiburg, and probably occurs throughout Germany except in the eastern part. In August 1923 larvae of *A. maculipennis* were taken at about 3,300 feet near Feldberg.

In Germany annoyance by mosquitos is chiefly due to *Aëdes* spp., especially *A. dorsalis*, which appears in numbers on the coast near Swinemunde after a rainy period. *Culex pipiens* can prove very troublesome on occasions.

A number of miscellaneous notes are given on the biting and other habits of various Culicines. Most of the species of the genus *Aëdes* have a spring generation, but a second brood, which may prove the more troublesome, may occur under certain conditions.

KERSCHNER (T.) & PRIESNER (H.). **Beiträge zur Verbreitung der Anophelen in Oberöstereich.** [Notes on the Distribution of *Anopheles* in Upper Austria.]—*79. Jahresber. Oberöst. Musealver. 1920–1921*, pp. 42–51. Linz, 1922.

The distribution of *Anopheles maculipennis*, Mg. (*claviger*, F.), *A. bifurcatus*, L., and *A. plumbeus*, Hal. (*nigripes*, Staeg.) throughout Upper Austria is given in detail, with brief biological notes.

SWELLENGREBEL (N. H.). **Over de pogingen tot vernietigen der larven van** *A. maculipennis*. [On the Attempts to destroy the Larvae of *A. maculipennis*.]—*Nederl. Tijdschr. Geneeskunde*, lxviii, 2nd Half, no. 13, pp. 1576–1591. [Amsterdam] 1924.

Much of the information given in this paper on measures against *Anopheles maculipennis* in Holland has been noticed already from other sources [*R. A. E.*, B, xii, 175, 192, 193].

So far as can be judged by the number of males, oiling the breeding-places around Amsterdam apparently reduced the numbers of *A. maculipennis*, at least in 1922. This effect was not apparent in 1923, which may be attributed in part to the scarcity of larvae in spring, a fact that rendered it difficult to find the important breeding-places. The clearing of breeding-places in 1921 also reduced the number of mosquitos in neighbouring houses.

IOFF (I.). **Die Arbeiten in der Malariabekämpfung des Instituts für Mikrobiologie und Epidemiologie des Südostens Russlands.** [The Anti-malarial Work of the Institute for Microbiology and Epidemiology for South-eastern Russia.] Communication à la Conférence internationale sur le paludisme organisée par le Comité d'Hygiène de la Société des Nations.—4 pp., Saratov, Inst. Microbiol. & Epidemiol. S.E. Russ., 1924.

This is a brief report of the scientific investigations and practical work, including anti-mosquito measures, carried out by the Institute in and around Saratov.

POPOV (P.). **Das Tropeninstitut und die tropischen Krankheiten Armeniens.** [The Moscow Tropical Institute and the Tropical Diseases of Armenia.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxviii, no. 10, pp. 453–458. Leipzig, October 1924.

The information contained in this paper has already been noticed from a Russian source [*R. A. E.*, B, xii, 149].

REYNE (A.). **Eenige proeven met vischjes en chemicaliën tot het dooden van muskietenlarven.** [Some Experiments with Fish and Chemicals against Mosquito Larvae.]—*Dept. Landbouw, Nijverheid en Handel in Suriname*, Bull. 47, 54 pp. Paramaribo, June 1924. (With a Summary in English.)

In Paramaribo, a city of about 45,000 inhabitants, filariasis is very prevalent, from 50 to 60 per cent. of the poorer classes being infected in 1909. Yellow fever occurs occasionally, the last epidemics being in 1902 and 1908–09. The dominant species of mosquitos are *Aëdes*

argenteus, Poir. (*aegypti*, L.) and *Culex fatigans*, Wied. Malaria is not endemic nor have Anophelines been found within the city limits, though they occur outside. The drainage ditches in the city proper do not breed mosquitos, owing to the presence of numerous fish, of which *Acanthophacelus reticulatus* is the most effective.

Experiments with this and other fish are described.

It was found that *Culex fatigans* could not thrive in water covered with *Lemna*, but that a native species of *Chara* had little effect on the larvae.

Various oils and larvicides were tested against *C. fatigans*. Using a thin film of 50 cc. per square metre of water surface it was found that kerosene was active only for 2 days, at an average temperature of 26° C. [78·8° F.]. The addition of crude oil decreased the spreading and killing quality of the kerosene. In barrels treated with kerosene, 50 cc. per square metre, half-grown larvae were present 6, 7, 9 and 15 days after treatment. In experiments with larvicides the pupae appear to exhibit greater resistance than the larvae. Creolin being the cheapest material, further tests were made, which show that a treatment every 2 weeks would probably suffice to prevent the adults from emerging. Creolin gradually loses its toxic properties, *e.g.*, a solution of 1 : 20,000 was effective for 12 days only. It is very poisonous to fish, and in a concentration of 1 : 10,000 *A. reticulatus* was killed in 24 hours.

At temperatures between 21° C. and 31° C. [69·8°–87·8° F.] the maximum life-cycle of *C. fatigans* was 11 days in water containing cowdung : 8 in water containing meat ; 11 in water and sediment from a cess-pit that was a prolific breeding-place ; and 8 in diluted beef extract.

In a test of Paris green as a larvicide, ten full-grown larvae of *Anopheles tarsimaculatus*, Goeldi, were placed in a shallow pan of water, and the surface of the water was dusted with a mixture of 1 part Paris green and 100 of lime. All the larvae were dead in 24 hours. In nature a pool containing many Anophelines was dusted with the same mixture at the rate of 50 grammes per 3 square metres [about 1 oz. per 18¼ square feet], and on the next day a quarter of an hour's search yielded only 1 full-grown and 2 small larvae. On the following day the dust had disappeared after rain, and 17 small larvae were taken in 15 minutes, while 6 days afterwards full-grown specimens were found. In practice the dusting therefore requires renewal once a week.

Piras (L.). **Anofelismo senza malaria.** [Anophelism without Malaria.] —*Igiene Moderna*, March 1924. (Abstract in *Ann. d' Igiene*, xxxiv, no. 10, pp. 731–733. Rome, October 1924.)

The author's view that the Genoese commune of Vezzano Ligure would be free from malaria as soon as the number of Anophelines, *Anopheles maculipennis*, Mg. (*claviger*, F.) and *A. bifurcatus*, L., was reduced [*R. A. E.*, B, ix, 60] is said to have been justified.

Schiassi (F.). **Fattori e modalità delle zone malariche.** [The Conditions of Malarial Zones and their Cause.]—*Arch. Patol. e Clin. med.*, January 1924. (Abstract in *Ann. d' Igiene*, xxxiv, no. 10, p. 733. Rome, October 1924.)

Since 1917 there have been noticed on the Adriatic coast between Venice and Monfalcone a zone of malignant tertian malaria on the

littoral and one of benign tertian behind it inland. Different species of Anophelines are not responsible, *Anopheles maculipennis*, Mg. (*claviger*, F.) being predominant in both areas. Nor do circumstances allow of the reason being a concentration of carriers of malignant tertian gametes on the littoral. Local conditions, such as the salinity of the water on the beaches or the marshy land, may possibly afford an explanation.

[Ildrym (D.).] **Ильдрым (Д.). Малярия в Азербайджане и меры борьбы с нею.** [Malaria in Azerbaijan and its Control.]—23 pp., 3 figs. Baku, 1924. Price 50 *kop.*

The development of the malaria parasites in the mosquito and man is briefly traced, and the distribution of the disease and its control in Azerbaijan are described. The remedial measures were adapted to the locality to be treated and included the destruction of breeding-places and quinine prophylaxis.

Strickland (C.). **Notes on Malaria in Hill Stations in or near the Eastern Himalayas.**— *Ind. Med. Gaz.*, lix, no. 11, pp. 549–550, 1 chart. Calcutta, November 1924.

These notes are summarised from three papers by Shortt, McCombie Young and the author, respectively [*R. A. E.*, B, xii, 61, 86, 87]. The author considers that under Shillong conditions malaria might be greatly reduced by arranging a system of contour hill-foot drains with subsoil pipes; failing this, a ribbon of jungle should be allowed to grow over the drains to prevent the breeding of *Anopheles maculatus*.

Haga (J.). **Aanteekening omtrent muskieten (II.).** [A Note on Mosquitos, II.]—*Geneesk. Tijdschr. Ned.-Indië*, lxiv, no. 5, pp. 815–834. Batavia, 1924.

This is a further supplement to the list of Dutch East Indian Anopheline and Culicine mosquitos already noticed [*R. A. E.*, B, x, 211; xii, 7]. Notes are also given on the characters of some of the Anophelines dealt with, the varieties of *Anopheles* (*Myzorhynchus*) *barbirostris* being discussed in detail.

Brug (S. L.). **De voornaamste Ned. Indische Culicinen.** [The Principal Dutch East Indian Culicines.]— *Vereen. tot Bevordering der geneesk. Wetenschappen in Nederl.-Indië*, 53 pp., 18 figs. Batavia, November 1924.

Little attention has been paid to Culicine mosquitos in the Dutch East Indies, although they are carriers of filariasis and possibly of some unclassified fevers. This booklet aims at assisting the identification of the principal Culicines found in houses in those regions. All the descriptions are original and are made from specimens in the Central Military Medical Laboratory, data as to breeding-places being mostly taken from existing literature. Keys are given to the 26 species found indoors.

Petrochi (J.) & Zuccarini (J. A.). **Présence du *Plasmodium danilewskyi* et d'*Haemoproteus* sp. dans le sang des Moineaux de Buenos-Aires.**—*C. R. Soc. Biol.*, xci, no. 31, pp. 1031–1032. Paris, 14th November 1924.

Plasmodium danilewskyi has been isolated from the blood of sparrows (*Passer domesticus*) in Argentina. *Culex pipiens*, *C. fatigans* (*quinquefasciatus*) and *Aëdes argenteus* (*aegypti*), which transmit this blood parasite, occur in the locality. On two occasions a mixed infection of *P. danilewskyi* and a species of *Haemoproteus* occurred.

Agramonte (A.). **Some Observations upon Yellow Fever Prophylaxis.**—*Jl. Trop. Med. & Hyg.*, xxvii, no. 21, pp. 285–287. London, 1st November 1924.

Although yellow fever has been stamped out successfully since its real nature has been understood, it still reappears from time to time, and outbreaks have occurred comparatively recently in certain parts of West Africa, Brazil, Mexico and San Salvador. It is difficult, if not impossible, to explain these phenomena otherwise than by admitting the probability of the persistence of infection in a mild or atypical form among children, generally co-existing with some degree of neglect of sanitary ordinances regarding mosquitos and their breeding-places. Any prophylactic measure that disregards the fundamental truths with reference to the aetiology of yellow fever, or that tends to neglect of their careful consideration, is a dangerous one. So-called protective vaccination is placed by the author in this category.

The vaccine at present used is one obtained from inoculations made in animals with *Leptospira icteroides*, and he considers that this spirochaete is not the causal organism of yellow fever, though it is possibly a symbiotic organism in cases of the disease, perhaps the one producing the haemorrhagic phase. In the symptoms produced in animals, and in other respects, *L. icteroides* closely resembles *L. icterohaemorrhagiae*, yet yellow fever and infectious jaundice are clinically and pathologically entirely unlike. In all known cases of insect-borne spirochaetal diseases the insects act as simple mechanical vectors, while there is reason to believe that in yellow fever the parasite must undergo some kind of evolution in the mosquito, since a definite period (about 12 days) must elapse before the infected mosquito is capable of reproducing the disease in man. No attempt has been made to demonstrate any evolution of *L. icteroides* in *Aëdes argenteus* (*aegypti*). An enriching process has been suggested, but it is known that no changes take place, and that the mosquito soon expels the *Leptospira* just as it took it in from the capillaries of the infected animal.

Ferguson (E. W.). **Deaths from Tick Paralysis in Human Beings.**—*Med. Jl. Australia*, 11th Year, ii, no. 14, pp. 346–348. Sydney, 4th October 1924.

Cases of tick paralysis in man are known to occur in the eastern coastal regions of Australia, but actual records are few. Between 1913 and 1921 four deaths have been certified as due to ticks. Notes on these cases and a few others are given. All except one were

children less than four years old. The tick responsible appears to be the common scrub tick, *Ixodes holocyclus*, Neum., though definite identification was possible only in one case. The female tick alone appears to be toxic, and the symptoms do not supervene until the tick has been attached for at least 3 or 4 days.

This tick is common throughout the coastal districts of eastern Australia and has been recorded from Western Australia and India. In nature it is a parasite of marsupials, occuring also on rodents and birds. It does not appear to be injurious to these hosts, but can cause a fatal paralysis in dogs. It has been suggested that it exerts a controlling influence in preventing the establishment of the fox in the coastal districts.

Magalhães (O. C. de). **A Peste dos Polmões.** [Vryburg's Disease or Multiform Septicaemia.]—*Mem. Inst. Oswaldo Cruz*, xvi, no. 1, pp. 71–286, 29 charts, 22 pls. Rio de Janeiro, 1923. (In English and Portuguese.) [Received 3rd December 1924.]

This obscure disease of cattle was believed by the author to be native to America, but Vryburg's description from Sumatra shows that it also occurs in the Dutch East Indies. The name " peste dos polmões " is descriptive of the swellings in the cutaneous form of the disease. Various forms of it are discussed ; it may attack cattle of all ages and races. The bacillus recognised by Vryburg as the causal agent seems very similar to one that the author has often isolated from the cutaneous form of the disease in Brazil.

As infection does not spread amongst animals in perfectly clean stables, though it does so readily in the open, it was thought possible that ticks may be concerned in transmission. This is the more probable as experimentally transmission of the disease through the digestive tract or the epidermis was difficult if not impossible. Transmission by infected pus would not explain the rapid spread of the disease, as ulceration only occurs in advanced cases. In the region of Minas Geraes *Amblyomma cayennense* and *Boophilus annulatus microplus* are the common ticks. Experimentally the disease can be reproduced in healthy calves by inoculating an emulsion obtained from these ticks taken from diseased cattle. The length of time they remain infective is limited, inoculation proving negative if they have been kept 15 days in the laboratory after collection. They are, however, infective immediately after being picked off diseased animals. There is no evolution of the micro-organism in the ticks. Larvae from infective ticks do not reproduce the disease. It would therefore appear that ticks are at any rate one of the factors in the transmission of the disease, though only as mechanical vectors. The measures suggested are tick eradication and preventive and curative inoculation.

Sergent (Ed.), Donatien (A.), Parrot (L.), Lestoquard (F.), Plantureux (Ed.) & Rougebief (H.). **Les Piroplasmoses bovines d'Algérie.**— *Arch. Inst. Pasteur d' Algérie*, ii, no. 1, pp. 1–146, 32 figs., 18 pls. Algiers, March 1924. [Received 21st November 1924.]

A résumé of this paper, which contains no mention of Arthropods, has already been noticed from another journal [*R. A. E.*, B, xii, 104].

The morphology and development of the blood parasites involved are dealt with in detail, with notes on the treatment of the diseases.

Senevet (G.) & Rossi (P.). **Contribution à l'étude des Ixodidés (IIè note). Etude saisonnière des Ixodidés de la région de Bouïra (Algérie).**— *Arch. Inst. Pasteur d' Algérie*, ii, no. 2, pp. 223–232. Algiers, June 1924. [Received 21st November 1924.]

During a previous investigation in Algeria [*R. A. E.*, B, xi, 173], there seemed to be a difference between the tick fauna on bovines in July and that in September.

Data since obtained at Bouira, in the centre of the Tell region, between November 1921 and September 1922, give an idea of the seasonal changes in the tick fauna of similar regions in Algeria.

A first group, comprising *Hyalomma lusitanicum* and *H. aegyptium* with its variety *impressum*, occurs on cattle throughout the year in nearly the same abundance. The second group comprises *Ixodes ricinus*, *Haemaphysalis punctata*, *Hyalomma mauritanicum*, *Rhipicephalus bursa* and *Boophilus* (*Margaropus*) *annulatus calcaratus*. These ticks become numerous at certain periods of the year, and then disappear until the following one. *I. ricinus* appears towards November, is fairly abundant in January and February, decreases in March and April, and disappears in May, being very rare in summer. *Haemaphysalis punctata* has a similar periodicity ; it occurs from October to March, disappears in April, and is very rare in summer. *Hyalomma mauritanicum* appears in June, decreases in July, and disappears in September. This sudden development contrasts with the constant occurrence of *H. aegyptium*, and is a biological proof of the specific status of *H. mauritanicum*. *R. bursa* has the same periodicity as *H. mauritanicum*, but the period during which it is numerous is somewhat longer, extending from May to September. *B. annulatus calcaratus* occurs from July to October or November.

Senevet (G.). **Description de la nymphe de** *Hyalomma mauritanicum* **Senevet 1922.**— *Arch. Inst. Pasteur d' Algérie*, ii, no. 2, pp. 233–234, 1 fig. Algiers, June 1924. [Received 21st November 1924.]

The nymph of *Hyalomma mauritanicum*, Senevet, is described from specimens taken on cattle at Bouira, in the Tell district of Algeria.

Vialette (C.). **Conformation et fonction des soies caudales chez les larves de quelques espèces d'Anophélinés.**— *Arch. Inst. Pasteur. d' Algérie*, ii, no. 2, pp. 235–238, 2 figs., 1 pl. Algiers, June 1924. [Received 21st November 1924.]

Larvae of *Anopheles maculipennis*, taken in Morocco from a stream, part of the surface of which was covered with *Potamogeton*, with a flow of ½ metre per second in places free from vegetation, were found to possess caudal tufts similar to those noticed in Malayan Anophelines by Lamborn [*R. A. E.*, B, ix, 134]. These are described and figured. Observations to ascertain if some particular adaptation is involved show that the hooked form of the hairs in the lower caudal tuft is very common in North Africa in *A. maculipennis*, and probably also in

A. bifurcatus and *A. algeriensis*. It is a fixed character and not an individual or peculiar adaptation to life in running water, but nevertheless, these caudal hooks do sometimes assist in anchoring the larvae.

DE BERGEVIN (E.). **Nouvelles observations sur les Hémiptères succeurs de sang humain.**—*Bull. Soc. Hist. nat. Afr. N.*, xv, no. 6, pp. 259–262, 1 fig. Algiers, 15th June 1924. [Received 21st November 1924.]

The species recorded from North Africa as sucking human blood are the Capsid, *Brachynotocoris puncticornis*, Put., and another unidentified species of *Geocoris* [*cf. R. A. E.*, B, xi, 194].

DESOIL (P.). **Valeur de l'hypothèse de l'infestation par oeufs de mouches myasiques dans le cas de myase intestinale chez l'Homme.**—*C. R. Soc. Biol.*, xci, no. 32, pp. 1079–1081. Paris, 21st November 1924.

The experiments described were carried out with eggs of *Calliphora vomitoria*. The results show that intestinal myiasis in man is not produced by ingestion of the eggs. Although *in vitro* the eggs are able to resist the chemical action of the gastric juices during a period of normal digestion, observation *in vivo* show that other factors intervene, and they are quickly killed.

[PAVLOVSKI (E. N.) & STEIN (A. K.).] **Павловский (Е. Н.) и Штейн (А. К.). Экспериментальные исследования над действием блох на человека.** [Experimental Observations on the Action of Fleas on Man.]—**Вестник Микробиол. и Эпидемиол.** [*Herald of Microbiol. & Epidemiol.*], iii, pt. 3, pp. 131–136. (With a Summary in German, p. 216.) Saratov, 1924.

In the experiments described, it was found that the lesions produced on the skin of man as the result of bites by *Ctenocephalus canis* and *Pulex irritans* are due to an enlargement of the skin tissue cells, which become filled with erythrocytes. The action of the saliva of fleas is much weaker than that of lice.

[ILOVAISKI (S. A.) & SHTIBEN (V. D.).] **Иловайский (С. А.) и Штибен (В. Д.). Су-ауру—трипанозомоз верблюда и лошади в Киргизской степи и Уральской Области.** [Surra—Trypanosomiasis of Camels and Horses in the Kirgiz Steppe and Ural Region.]—**Вестник Микробиол. и Эпидемиол.** [*Herald of Microbiol. & Epidemiol.*], ii, pt. 1–2, pp. 51–62 ; iii, pt. 3, pp. 160–181, numerous charts, 2 figs. (With a Summary in German, p. 222.) Saratov, 1924.

Natural and experimental infection of camels and horses with surra in the Kirgiz Steppe and the Ural region, and the clinical aspects of the disease are discussed. Further notes from the senior author's diary have been collected since his death by N. S. Ilovaiskaia and B. P. Bozhenko.

Труды 4-го противочумного краевого совещания при государственном краевом институте микробиологии и эпидемиологии ю.-в. России в г. Саратове с 19-го по 23-е Марта 1924 г. [Proceedings of the Anti-plague Conference of the Government Institute of Microbiology and Epidemiology of South-Eastern Russia at Saratov, 19th–23rd March 1924.]—205 pp., 3 pls., 2 charts, 1 map. Saratov, 1924.

The distribution of plague in south-eastern Russia is described by the officials in charge of the various localities. In each case the death-rate and general severity of the disease in the local centres, and the remedial measures adopted are discussed. The latter include mainly vaccine treatment and the destruction of rodents. Future work is to include extensive experimental observations, covering also possible insect vectors. The resolutions passed at the conference are also given in French.

Nikanorov (S.). **La Peste et la Lutte contre elle au Sud-Est de la Russie.**—*Inst. Microbiol. & Epidemiol. Sud-Est Russ.*, 2 pp., 1 map, 2 charts. Saratov, 1924.

This brief summary on the subject of plague and its control in south-eastern Russia [see preceding paper] was presented at the international conference on malaria organised by the committee of hygiene of the League of Nations.

Blacklock (D. B.) & Thompson (M. G.). **Rat-fleas in Freetown, Sierra Leone.**—*Ann. Med. & Sanit. Rept. 1923*, p. 66. Freetown, 1924.

This information has already been noticed from another source [*R. A. E.*, B, xii, 153].

Aserappa (C. V.). **Malaria in Ceylon.**—*Colombo: Rept. Med. Officer of Health 1923*, p. 15. Colombo, 1924.

Anopheles hyrcanus (*sinensis*) was found breeding in the vicinity of several locally acquired malaria cases. Other known malaria-carriers breeding in Colombo are *A. culicifacies* and *A. listoni*. *A. subpictus* (*rossi*) also occurs in very large numbers, but the part it plays as a carrier of malaria has not been proved.

Hirst (L. F.). **Plague.**—*Colombo: Rept. Med. Officer of Health, 1923*, pp. 47–49, 1 map. Colombo, 1924.

Over 98 per cent. of the fleas harboured by rats in the plague-free districts in Ceylon are *Xenopsylla astia*, but in the endemic plague zone about 30 per cent. are *X. cheopis*, which infests as many as 75 per cent. of the rats from the Customs premises and Government granaries. It has been suggested that *X. astia* might carry plague at the ranges of temperature occurring up-country; experiments were therefore made of keeping infected fleas at temperatures of 70–75°F. A positive result was obtained with one out of 60 infected fleas. This flea became temporarily blocked by the growth of plague bacilli in the gizzard.

The regurgitation phenomenon was typical, and 2 of 3 rats bitten died of plague. Further attempts have been made to transmit the disease from rat to rat by this species, but even under the most favourable climatic conditions the results all proved negative, whereas successful transmission was obtained with *X. cheopis*. The latter is less affected by climatic conditions than *X. astia*, but both species become less numerous on rats as the weather gets hotter, and the power of each to transmit the disease also diminishes. Further work on the bionomics of the two species are needed before their general relationship to the prevalence of plague can be finally determined. A considerable difference in the biting powers of the two fleas was noticed, which may help to explain the difference in their efficiency as vectors of plague. The proportion of *X. cheopis* is diminishing on rats caught in the plague areas where the old underground drains have been abolished. The temperature of the air in these sewers is lower and the relative humidity higher than above ground.

SINTON (J. A.). **Notes on some Indian Species of the Genus** *Phlebotomus*. **Part ix.** *Phlebotomus simillimus* **var.** *hospitii* **nov. var.**— *Ind. Jl. Med. Res.*, xii, no. 2, pp. 261–271, 1 pl. Calcutta, October 1924.

Phlebotomus simillimus var. *hospitii*, n., was taken in Kashmir at a height of 2,023 feet. The characters distinguishing the male from those of the other Indian species of *Phlebotomus* are given, and the points of difference between the new variety and the typical *P. simillimus*, Newst., which has only been recorded from West Africa, are tabulated in detail.

CHRISTOPHERS (S. R.). **Some further Varieties of Indian Species of** *Anopheles*, **with Notes on the Species** *A. pallidus* **Theobald and** *A. philippinensis* **Ludlow.**— *Ind. Jl. Med. Res.*, xii, no. 2, pp. 294–301. Calcutta, October 1924.

The new varieties described are *Anopheles culicifacies adenensis*, from the neighbourhood of Aden, and *A. maculatus dravidicus* and *A. jeyporensis moghulensis*, both widely distributed in India, of which, however, only the last is entirely satisfactorily definable. *A. varuna*, Iyengar, is considered to be a variety of *A. minimus*, Theo. *A. philippinensis*, Ludl., is considered to be a distinct species. It is represented in India only from Chittagong and the Andamans. The Indian distribution of the species dealt with is discussed, *A. pallidus*, Theo., being also recorded from Burma. As *A. multicolor*, Camb., has been recorded from East Persia, British Baluchistan and the North-West Frontier, this species must be added to the Indian list.

BARRAUD (P. J.). **A Revision of the Culicine Mosquitoes of India. Part xvii.**— *Ind. Jl. Med. Res.*, xii, no. 2, pp. 427–434, 5 pls. Calcutta, October 1924.

In this continuation of previous papers [*R. A. E.*, B, xii, 163] the larvae of *Culex sitiens*, Wied., *C. gelidus*, Theo., *C. theileri*, Theo., *C. tipuliformis*, Theo., *C. fatigans*, Wied., *C. perexiguus*, Theo., *C. fuscocephalus*, Theo., *C. brevipalpis*, Giles, and *C. tenuipalpis*, Barr., are described.

Shortt (H. E.) & Swaminath (C. S.). **The Behaviour of Cultures of *Herpetomonas donovani* in Bed Bugs, *Cimex lectularius*, Linn., and *Cimex hemiptera*, Fabr.**—*Ind. Jl. Med. Res.*, xii, no. 2, pp. 391–396, 3 pls. Calcutta, October 1924.

The present work largely confirms that of Cornwall and his collaborators [*R. A. E.*, B, vi, 207 ; x, 73, etc.], in which it is presumed that *Cimex hemiptera* (*rotundatus*) was the species experimented with. Both this bug and *C. lectularius* were fed on cultures of *Leishmania* (*Herpetomonas*) *donovani*, the differences in development in the two species being described. On the whole, infection does not last so long in *C. hemiptera*. In it the flagellates migrate to the hinder narrow portion of the midgut soon after ingestion, whereas in *C. lectularius* they are not found in this situation before the second or third day. Although from these experiments it would appear that *L. donovani* finds a more suitable medium in *C. lectularius* than in *C. hemiptera*, it must be remembered that the conditions were not natural and that the mere presence of blood under normal conditions of feeding might greatly alter the course of events.

Row (R.). **On some Pathological Observations in Experimental Leishmaniasis in Mice with special Reference to generalised Infections set up by *Leishmania tropica*.**—*Ind. Jl. Med. Res.*, xii, no. 2, pp. 435–438, 1 pl. Calcutta, October 1924.

The object of the present paper is to record the pathological changes taking place in the organs of mice heavily infested by *Leishmania tropica* or in some cases by *L. donovani*. The technique employed is described. Invasion of the intestine by *Leishmania* is of importance, in view of the possibility of the parasites being transmitted in faeces. *L. tropica* was found in what might be called the duodeno-jejunal portion of the animal's intestine, where the lymphoid tissue was most prominent in the submucosa. Other sections both of the small and large intestine were quite free from parasites, the invasion by which appears to be a terminal phase in the course of the generalised infection. Mice similarly infected with *L. donovani* failed to reveal any intestinal invasion. The liver and spleen sections are identical with those from mice infected with *L. tropica*.

Phillips (W. W. A.). **Ecto-parasites of Ceylon Bats.**—*Spolia Zeylanica*, xiii, no. 1, pp. 65–70. Colombo, 16th September 1924. [Received 1st December 1924.]

A summary is given of notes, collected within the last two years, on the ectoparasites of bats in Ceylon. The species listed include 9 Nycteribiids, 4 Streblids, 1 Polyctenid, and 8 unidentified mites.

Cooling (L. E.). **Anopheline Mosquitoes of North Australia and the Tropical Dependencies of Australia. Preliminary Notes.**—*Commw. Australia Dept. Health*, Serv. Pubn. (Trop. Div.), no. 3, pp. 97–141, 16 figs. Melbourne, 1924.

This paper forms an appendix to Cilento's work on malaria in Australia [*R. A. E.*, B, xii, 168]. The first part deals with the systematic position of mosquitos in general, the life-history of *Culex fatigans* (*quinquefasciatus*) being given as representative of the family

generally. A synoptic table of the Culicini, modified from Edwards (1922), is given.

In the second part the common Anophelines of North Australia and New Guinea are listed, including descriptions and notes on bionomics and distribution. They are *Anopheles annulipes*, Wlk., *A. punctulatus*, Dön., and *Bironella gracilis*, Theo.

Cooling (L. E.). **Seven Common Species of Mosquitoes described for Purposes of Identification.**—*Commw. Australia Dept. Health*, Serv. Pubn. (Trop. Div.), no. 1, 24 pp., 4 figs. Melbourne, 1924.

The species described are *Culex fatigans*, Wied. (*quinquefasciatus*, Say), *C. sitiens*, Wied., *Aëdes argenteus*, Poir. (*aegypti*, L.), *A.* (*Finlaya*) *notoscriptus*, Skuse, *A.* (*Ochlerotatus*) *vigilax*, Skuse, *Anopheles* (*Nyssorhynchus*) *annulipes*, Wlk., and *Mucidus alternans*, Westw.

Walker (M. J.). **Some Observations on the Transmission of *Filaria bancrofti* in Queensland.**—*Australian Jl. Exptl. Biol. & Med. Sci.*, i, pt. 2, pp. 39–45, 7 figs. Adelaide, 16th June 1924. [Received 8th December 1924.]

Complete development of *Filaria bancrofti* has been observed in seven or eight different mosquitos [*R. A. E.*, B, x, 179], and partial development in many others, in which, however, infective forms have not been found in the proboscis. In the present work experiments were made with *Culex fatigans*, Wied. (*quinquefasciatus*, Say), *C. annulirostris*, Skuse, *Aëdes vigilax*, Skuse, and *A. argenteus*, Poir. (*aegypti*, L.). Although many hundred individuals of these species were examined, taken from random collections, no parasite was seen, so that it is assumed that only a small percentage of the general mosquito population is infected.

Under laboratory conditions *C. fatigans* proved the most efficient host for *F. bancrofti* in Queensland. Mosquitos were found to be infective in very hot weather 9½ days after feeding on an infected patient, whereas the usual time for complete development of the filaria is from 11 to 16 days. In *C. annulirostris* partial development was observed. Complete development may perhaps occur under very favourable circumstances. *A. vigilax* is not an efficient host and is killed by the parasite, whilst in *A. argenteus* no development at all occurred even though the mosquitos were fed on a patient showing reversed periodicity of the microfilariae after working at night.

Stefko (W. G.) & Botchkareff (P. V.). **Sur quelques propriétés morphologiques du sang dans le paludisme.**—*Bull. Soc. Path. exot.*, xvii, no. 8, pp. 631–637. Paris, October 1924.

Malaria in Russia seems to have become pandemic in character. During 1923, ten million cases are said to have been registered, and a number of malaria stations have been organised in different provinces. The present paper discusses the situation at a station in the south-west of the Crimea, on the Black Sea, where very little malaria had occurred during recent years until the present outbreak, which is probably due to the swampy ground formed around artesian wells, which are not used carefully. *Anopheles maculipennis*, Meig., is found breeding in abundance throughout the locality, and seems to have completely

driven out Culicines. Cases of malaria occur in 80 to 100 per cent. of the population, *Plasmodium vivax* being the only form found in the blood. The morphological changes in the blood of malaria cases in this locality are described, and the influence of famine and other infections (such as typhus) is discussed.

VAN SACEGHEM (R.). **Les Theilérioses. Note préliminaire.**—*Bull. Soc. Path. exot.*, xvii, no. 8, pp. 637–639. Paris, October 1924.

This is a preminінary note on piroplasmosis at Ruanda published, in view of statements made by other investigators, before the appearance of the author's longer work. At Ruanda-Urundi, Kivu and Ituri, where African coast fever is enzootic, there occurs a disease identical with one recently described in Algeria as due to *Theileria dispar* (a new species) [*R. A. E.*, B, xii, 104], but while this disease was described as having no chronic form, the author has known chronic cases. He is of the opinion that this disease and that attributed by Brumpt to *T. mutans* [*R. A. E.*, B, xi, 131] are the same, and that all these diseases are merely forms of African coast fever, caused by *T. parva*. This will be discussed at greater length in a future paper.

DESCAZEAUX (J.). **L'Anaplasmose au Chili.**—*Bull. Soc. Path. exot.*, xvii, no. 8, pp. 639–642. Paris, October 1924.

Diseases of animals caused by protozoa are rare in Chile ; some cases of mal de caderas have occurred among imported Argentine cattle, but the disease has never spread. Anaplasmosis has not previously been recorded, but it has occurred in the Traiguen region (central Chile) for several years, and some ranches have had many losses from it. The symptoms and nature of the disease are discussed. The parasite inoculating the disease has not as yet been determined ; no species of tick has been found on the infected animals, nor is any known to occur, even in summer, in the region. The author considers it certain that the disease is transmitted by blood-sucking insects, though it continues to spread in the affected areas in winter, when they are very rare.

LEGENDRE (J.). **L'Anophélisme à Lataquié.**—*Bull. Soc. Path. exot.*, xvii, no. 8, pp. 653–657. Paris, October 1924.

An inspection of Latakia (northern Syria) made from October 1922 to May 1923, for the purpose of determining whether *Anopheles* was present, showed the presence of larvae of *Aëdes argenteus* (*Stegomyia fasciata*) in the cisterns of houses and of Anopheline larvae in the wells. Few adult Anophelines were found about the houses in autumn and winter ; in late January and in February single females of *Anopheles bifurcatus* were found ; during March adults were more frequently observed, but they had disappeared by the beginning of April. This was the only Anopheline found during the cooler months. It evidently prefers the dark, clear water of cisterns and household wells, and does not readily oviposit in exposed artificial water. At Beyrout, however, the larvae have several times been found in the bed of the river and in small, exposed collections of water, while in the winter, when the river becomes too swollen and rapid for breeding, they have occasionally been found in wells in the open and even in a ditch. In view of the

limited surface available for breeding in wells and their evaporation in the summer, Anophelines from this source must be very limited in number, and it seems possible that there may be one or more other species of Anopheline in Latakia in the hot season. At Beyrout, where only *A. bifurcatus* and *A. superpictus* have been observed, the latter was not discovered until August. Malaria is, however, almost non-existent in Latakia, only one indigenous case having been found. Therefore, though *A. bifurcatus*, in the absence of breeding places outside the town, has been driven to oviposit in the neighbourhood of man, it either tends to avoid him or does not readily carry malaria.

Flu (P. C.). **Mesures de Prophylaxie anticholérique et antipesteuse aux Indes Néerlandaises.**—*Bull. Soc. Path. exot.*, xvii, no. 8, pp. 703–714. Paris, October 1924.

This is a lengthy discussion of the work of the quarantine service in the Dutch East Indies, with particular reference to the exclusion of plague, yellow fever and cholera. The efficacy of the measures taken at the ports and on ships is criticised. Experience in the fumigation of houses with sulphur dioxide has shown that as soon as the fumes begin to be felt, fleas leave the rats and hide in the dust on the ground or in holes in wood or furniture and are thus protected from the fumes. Plague infection is, in fact, frequently more severe after fumigation than before, as the fleas that have been driven from their rat hosts attack the persons that enter the house after the process. It is obvious that the same thing will happen on ships, especially cargo boats, fumigated with sulphur dioxide by the Clayton method, particularly when they contain cargo in which rats, and still more the fleas, are able to hide. The author is of the opinion that it might be better to alter the present official measures against the introduction of plague. An anti-rat campaign has been maintained in the goods trains and the lighters carrying cargo to the steamers. One treatment every three months keeps the rats down to negligible proportions. It is suggested that if similar measures were taken under the supervision of an international convention, ensuring the regular destruction of rats on all ships, effective results would be obtained, while the quarantine service would be considerably simplified.

Bequaert (J.). **Un Hyménoptère Béthylide qui pique l'homme dans les habitations au Congo.**—*Ann. Soc. belge Méd. trop.*, iv, no. 2, pp. 163–165. Brussels, November 1924.

Females of a Bethylid, probably of the genus *Sclerodermus*, are recorded as biting man indoors in the Belgian Congo [*cf. R. A. E.*, B, ix, 45]. The larvae of *Sclerodermus* attack those of the beetles that destroy furniture and books, and the specimens taken emerged from bore-holes in furniture.

Van Saceghem (R.). **Note sur la dispersion des Glossines au Kivu.**—*Ann. Soc. belge Méd. trop.*, iv, no. 2, p. 177. Brussels, November 1924.

Roubaud has recorded specimens of *Glossina palpalis* var. *fuscipes*, Newst., said to have been collected by Cronier in the Kivu volcanoes at 5,000–10,000 feet altitude. Bequaert regards this as a mistake in labelling, and the author has never met with *Glossina* in this volcanic region, nor do the flies occur on the banks of Lake Kivu.

TROLLI (G.). **Contributions à l'étude de la distribution géographique des Glossines.**—*Ann. Soc. belge Méd. trop.*, iv, no. 2, pp. 181–190, 1 map. Brussels, November 1924.

Notes are given on the distribution of *Glossina* in the Eastern Province and the Katanga district of the Belgian Congo.

VAN DEN BRANDEN (F.) & VAN HOOF (L.). **Rapport sur le fonctionnement du Laboratoire de Léopoldville pendant l'année 1923.**—*Ann. Soc. belge Méd. trop.*, vi, no. 2, pp. 231–245. Brussels, November 1924.

During a study of the epidemiology of malaria, a full report of which will be published later, the following mosquitos were captured in dwellings in villages near Leopoldville: *Anopheles costalis*, L., 23 per cent.; *A. marshalli* var., 3; *A. funestus*, 3; *Taeniorhynchus cristatus*, 1; *T.* (*Mansonioides*) *uniformis*, 8; and *T.* (*M.*) *africanus*, 3; together with *Aëdes argenteus* and *Culex* spp.

INNES (F. A.). **Sanitation.**—*Gambia: Ann. Med. & Sanit. Rept. 1923*, pp. 9–15. London, 1924.

Bathurst continues to be heavily infested with mosquitos. Culicines and Anophelines occur in the rainy months, but *Aëdes* (*Stegomyia*) is constantly present. *Megarhinus* (*Toxorhynchites*) *brevipalpis* and *Mucidus mucidus* are added to the local list.

MILLER (R. H.). **Annual Sanitary Report for the Protectorate and Georgetown. 1923.**—*Gambia: Ann. Med. & Sanit. Rept. 1923*, pp. 15–17. London, 1924.

An investigation into the occurrence of tsetse on part of the River Gambia resulted in the finding of only one species, *Glossina palpalis*, most of the flies being caught on a steam launch and a few on the river bank. One doubtful case of sleeping sickness was seen, and two dogs were found to be heavily infected with trypanosomes.

Tsetse-fly Map, Tanganyika Territory.—*Tanganyika Territ: Ann. Rept. Vet. Sci. & Anim. Husb. 1923*, 43 pp., 1 map. London [1924].

The coloured map of Tanganyika Territory published with this report shows the cattle areas, the areas infested by *Glossina*, suspected areas, and areas not yet surveyed entomologically. It has been compiled from the German map of 1914 [*R. A. E.*, B, iv, 47], supplemented by observations by the Veterinary Department from 1916 to 1921.

ROOT (F. M.). **The Larval Pilotaxy of** *Anopheles quadrimaculatus* **and** *Anopheles punctipennis.*—*Amer. Jl. Hyg.*, iv, no. 6, pp. 710–724, 5 figs. Baltimore, Md., November 1924.

The close resemblance of the larval stages of *Anopheles quadrimaculatus* and *A. punctipennis* is one of the reasons that has delayed the testing of the theory that the former species is the principal carrier of malaria in the Eastern United States, while the other plays only a very subordinate part. This paper describes the larval hairs of *A.*

quadrimaculatus and discusses the differences observed in *A. punctipennis*. These are, however, so minute that their practical value is doubtful. A similar study is to be made of *A. crucians*, of which there seem to be two larval varieties, one with five pairs of palmate hairs, agreeing with published descriptions, and probably breeding only in brackish water, and the other identical with the larva of *A. quadrimaculatus*, so far as the palmate hairs are concerned, and breeding in fresh water. This, however, needs further investigation.

Rau (P.). **The Biology of the Roach,** *Blatta orientalis* **Linn.**—*Trans. Acad. Sci. St. Louis*, xxv, no. 4, pp. 57–79, 1 fig. St. Louis, Mo., April 1924. [Received 2nd December 1924.]

The oriental cockroach, *Blatta orientalis*, L., has a life-cycle of about a year in St. Louis. Captive adults died between 1st July and 2nd August, and all those in nature also disappear at this period. Very soon afterwards the young nymphs may be noticed; they reach a fair stage of development in autumn and in captivity become adult in May or June. The proportion of the sexes was 47 males to 31 females. The mean date of emergence of the males was slightly in advance of that of the females. The females gave no evidence of solicitude for the newly hatched larvae. In the nymphal stage it is hardly possible to distinguish the sexes. The adult females have only rudimentary wings, and the author has never seen the males fly. The average life of the adult male was 40·2 days and of the female 43·5. The female deposits from 1 to 4 egg-cases, which are dropped after being carried about for 2–3 days, and are usually concealed or plastered with earth, etc. The period of oviposition extended from the latter part of May to the end of July. The number of nymphs that hatched from each of 43 egg-cases varied from 12 to 18. Cockroaches seem to require more water than do most insects. Mould and mites on their food do not seem to affect them. The larvae of *Dermestes* often infest the egg-cases, and fowls are said to feed on them greedily.

Ewing (H. E.). U.S. Bur. Ent. **Sucking Lice from Jack Rabbits.**—*Amer. Jl. Trop. Med.*, iv, no. 6, pp. 547–551. Baltimore, Md., November 1924.

The specific identity of the lice occurring on jack rabbits is a matter of importance, as these rodents are reservoirs of tularaemia, which is now known to be well established in Utah. Besides *Haemodipsus ventricosus*, Denny, which was used in the demonstration of the method of transmission from rabbit to rabbit [*R. A. E.*, B, ix, 189] other Anoplura from the rabbit are the common sucking louse of the dog, *Linognathus piliferus*, Burm., and *Haemodipsus setoni*, sp. n., described here from *Lepus californicus* from Kansas.

Belschner (H. G.). **Parasites of the Skin of Sheep.**—*Agric. Gaz. N.S.W.*, xxxv, pt. 10, pp. 723–728. Sydney, 1st October 1924.

An account is given of the life-history and occurrence of *Melophagus ovinus*, L. (sheep ked) and the biting louse, *Trichodectes sphaerocephalus*, Nitz., in New South Wales. The effect of these parasites on sheep is described, the remedial and preventive measures consisting of correct dipping and general hygiene.

Bushnell (L. D.) & Hinshaw (W. R.). **Prevention and Control of Poultry Diseases.**—*Kansas Agric. Expt. Sta.*, Circ. 106, 78 pp., 25 figs. Manhattan, Kans., July 1924. [Received 29th December 1924.]

A list is given of the parasites of poultry occurring in Kansas and the neighbouring States, with notes describing the symptoms and treatment. Different species of tapeworms are ingested by the birds with snails, stable-flies [*Stomoxys calcitrans*] or house-flies [*Musca domestica*]; these being necessary intermediate hosts. The Arthropods directly attacking poultry are various mites, lice and the fowl tick, *Argas persicus* (*miniatus*).

Clinton (H. F.). **Poultry Parasites.**—*Jl. Dept. Agric. Victoria*, xxii, pt. 10, pp. 624–631, 10 figs. Melbourne, October 1924.

A brief account is given of the various external and internal parasites of poultry, with suggestions for their control, those dealt with including lice, mites and ticks.

Hardy (G. H.). **A Blowfly and some Parasites.**—*Queensland Agric. Jl.*, xxii, pt. 5, pp. 349–350. Brisbane, November 1924.

A study of the parasites of *Lucilia* in Queensland has shown that the Chalcid, *Mormoniella* (of which *Nasonia* is a synonym) feeds between the outer puparium and the living pupa. Many eggs are laid during the immune stages of the host, that is the first day or last two days of the pupal stage, when the puparium is too young or too old to be affected. The Proctotrupid, *Paraspilomicrus*, lives within the developing pupa of the fly, but develops much more slowly than *Mormoniella*. Where both occur in one host, only the latter survives; *Paraspilomicrus*, however, is able to parasitise the puparium a few hours after pupation has occurred. The third species studied was a Chalcid, *Tachinaephagus* (*Australencyrtus*), which lays its eggs on the fly larvae. This species emerged from eggs laid on the fly larvae between one and seven days before the formation of the puparium. Great variations were observed in the duration of the prepupal stage of the fly, but further experiments are necessary to ascertain the relation, if any, between this variation and the presence of the parasites, and the possible effect on the latter.

Malloch (J. R.). **The recorded Calliphoridae of New Zealand (Diptera).**—*Trans. & Proc. N.Z. Inst.*, lv, pp. 638–640. Wellington, N.Z., 30th September 1924. [Received 29th December 1924.]

Keys are given to all the genera and species of Calliphorine flies known to occur in New Zealand and the adjacent Islands.

The species of economic importance include *Lucilia caesar*, L., *Chrysomyia albiceps*, Wied. (*rufifacies*, Macq.), *Calliphora erythrocephala*, Mg., and *Pollenia stygia*, F. (*C. villosa*, R.-D.).

HEGNER (R. W.), CORT (W. W.), & ROOT (F. M.). **Outlines of Medical Zoology ; with Special Reference to Laboratory and Field Diagnosis.** —Cr. 8vo, xv+175 pp., 21 pls. New York, The Macmillan Co. ; London, Macmillan & Co., Ltd., 1923. Price 11s. net. [Received 9th January 1925.]

The authors have condensed their wide knowledge and practical experience in this useful little book intended for the use of public health officers, students and physicians, especially those practising in tropical or semi-tropical countries. The first two parts are devoted to the protozoological (Hegner) and helminthological (Cort) aspects of medical zoology, respectively.

Dr. F. M. Root contributes part iii—"Arthropods of Medical Importance" (pp. 101–165), the chief diagnostic characters of each group being briefly discussed and illustrated, with a few of the more important references to the literature ; notes on the collecting, killing, preserving, etc., of specimens are also given.

MARTINI (E.). **Prinzipielle Bemerkungen zu Fragen biologischer Schädlingsbekämpfung in der medizinischen Entomologie.** [Observations on the Principles underlying Questions of the Biological Control of Pests in Medical Entomology.]— *Verh. Deutsch. Ges. angew. Ent., 4. Mitgliederversamml. Frankfurt a. M.* 10. *bis* 13. *Juli 1924*, pp. 62–68. Berlin, 1924.

If one of the components of a biological complex is introduced from outside in large numbers, the equilibrium is only disturbed for a time. Malaria of the post-war period is a striking example of this, for in spite of a huge introduction of infected persons, the amount of malaria in countries more or less free from malaria soon returned to its previous low level. From the point of view of dealing with malaria the method of using fish against mosquito larvae generally requires the renewal of the fish from time to time.

The cases where a lasting result has been attained are those where a foreign element has been introduced into the existing complex. Biological control of an ideal character is represented by the lasting change of the natural balance of life by one interference. An alternative consists in repeated interferences, which then become similar to physical or chemical artificial measures, though they may be cheaper than such measures.

The results obtained hitherto show that the introduction of exotic enemies and remodelling of the surface of land are the most lasting and often the most economically valuable measures.

COLLIER (W. A.). **Die Rolle der Wanze als Krankheitsüberträger.** [The Rôle of the Bug as a Transmitter of Disease.]— *Verh. Deutsch. Ges. angew. Ent., 4. Mitgliederversamml. Frankfurt a. M.* 10. *bis* 13. *Juli 1924*, pp. 69–81. Berlin, 1924.

This paper reviews the literature on the bed-bugs, *Cimex lectularius* and *C. hemiptera* (*rotundatus*), as transmitters of disease, the conclusion being that their importance has been somewhat exaggerated. No part is played in the epidemiology of relapsing fever, though there is a possibility of occasional mechanical transmission, which may sometimes also occur with plague and leprosy. A bibliography of 100 references is given.

Dyar (H. G.) & Shannon (R. C.). **The Subfamilies, Tribes and Genera of American Culicidae.**—*Jl. Washington Acad. Sci.*, xiv, no. 20, pp. 472–486, 4 figs. Baltimore, Md., 4th December 1924.

As a result of the recent increase of knowledge of the characters of adult mosquitos, a revised synopsis of the subfamilies, tribes and genera of the American Culicidae is given, with keys. The Chaoborinae (Corethrinae) and Dixinae, which are now generally regarded as true Culicidae, are included.

Root (F. M.). **Notes on Mosquitoes and other Blood-sucking Flies from Porto Rico.**—*Amer. Jl. Hyg.*, ii, no. 4, pp. 394–405, 5 figs. Baltimore, Md., June 1922.

This paper has already been noticed from an abstract [*R. A. E.*, B, xi, 5] ; additional details are now available.

The blood-sucking Diptera obtained by the author were *Culicoides furens*, Poey (*maculithorax*, Will.), which bites readily in the evening and even in the middle of the day in shade ; *Simulium quadrivittatum*, Lw., not so numerous as the former in the coastal plains, but biting even in hot sunlight in the middle of the day ; *Anopheles albimanus*, Wied., larvae of which were found in many different kinds of pools, often unshaded but usually with some aquatic vegetation, and more abundant near the coast ; *A. grabhami*, Theo., probably found throughout the coastal plains, but in smaller numbers, and having very local breeding-places ; *Uranotaenia socialis*, Theo., larvae of which were always present in a small swampy ditch containing *Spirogyra* ; *U. lowi*, Theo., found in grassy meadow pools kept filled for some time by frequent rains ; *Aëdes* (*Stegomyia*) *argenteus*, Poir. (*aegypti*, L.), common in and around houses in the coastal plain ; *A. portoricensis*, Ludl., which is probably only a geographical race of *A. taeniorhynchus*, Wied. ; *A.* (*Ochlerotatus*) (?) *condolescens*, D. & K., found in temporary rain pools in company with *Psorophora jamaicensis*, Theo., a description being given of the mature larva ; *Culex fatigans*, Wied. (*quinquefasciatus*, Say), common everywhere in the coastal plains and breeding in all sorts of artificial containers ; *C. nigripalpus*, Theo., var. *similis*, Theo. (*microsquamosus*, Grabh., *regulator*, D. & K., *prasinopleurus*, Mart.), found in small numbers in temporary meadow pools and in enormous numbers in a ditch highly polluted with sewage ; *C.* (*Melanoconion*) *atratus*, Theo. (*falsificator*, D. & K.), found in a semi-permanent roadside swamp ; *C.* (*Choeroporpa*) *borinqueni*, sp. n., found breeding in many kinds of ditches, often in company with *Anopheles albimanus* ; *Deinocerites cancer*, Theo., probably found throughout the coastal plains where crab-holes occur ; *Chrysops costata*, F., found round mangrove swamps and attacking man ; and *Stomoxys calcitrans*, L., common everywhere on domestic animals. A dragonfly, probably *Lepthemis vesiculosa*, F., was seen to capture an individual of *Chrysops costata*.

Peryassú (A. G.). **Os Anophelines do Brazil.** [Anophelines of Brazil.]—*Arch. Mus. Nac. Rio de Janeiro*, xxiii, pp. 9–101, 32 figs. Rio de Janeiro, 1921.

The characters and classification of the Anophelines of Brazil and their distribution are dealt with fully, with short biological notes.

Anopheles (*Cellia*) *tarsimaculatus*, Goeldi, is added to those already recorded [*R. A. E.*, B, ix, 5, 6], and this species and *A. cruzi*, D. & K. (*lutzi*, Theo.), are additional malaria carriers.

HOWARD (L. O.). **Some Recent Developments in Mosquito Work.**—*Proc. 11th Ann. Meeting New Jersey Mosquito Exterm. Assoc., 1924*, pp. 8–20. Atlantic City, N.J., 1924.

In this summary of recent anti-mosquito work, the theories of Caballero respecting the value of *Chara* spp. against mosquitos, which have been noticed from time to time in this *Review* are discussed. They have been tested to some extent in the United States. *Chara foetida*, at least, which occurs near Ithaca, seems to have some effect upon the larvae of certain mosquitos, though the larvae of Anophelines, probably owing to their manner of surface feeding, are not affected. Further experiments are abundantly warranted, and there seems to be hope of a practical outcome, although perhaps not of great and widespread importance. During the past year an active principle has been isolated from *C. foetida* by Dr. T. A. Henry, of the Wellcome Bureau, London, which has been shown to be toxic to mosquito larvae and which appears to be somewhat similar to the well-known Malay fish poison, derris. As regards investigations as to the value of bat-roosts as an anti-mosquito measure, all available evidence indicates that in the southern States they will have no appreciable effect on the mosquito population. Grassi reports that the most malarious parts of Italy are those that have the densest bat population. In a special memorandum on the subject, by Dr. E. W. Nelson, it is shown that the habits and variety of species of bats render their value as a systematic control for mosquitos nil, and in his opinion the bat-roost theory lacks proper scientific basis ; in particular the food habits of bats seem to have been insufficiently studied in propounding it.

Some observations have been made in the United States with respect to Roubaud's theory regarding the value of domestic animals in affording protection from malaria. No support has as yet been found of the European claims as to the evolution of different races of a single species. The latest experiments indicate that none of the malarial mosquitos common in America shows any special predilection for domestic animals over man when such factors as size and amount of exposure are excluded. Neither has it been found that feeding on a domestic animal would affect the subsequent susceptibility of *Anopheles* to malaria parasites.

Further mosquito work that has already been dealt with in this *Review* is discussed.

LIPMAN (J. G.). **Anti-mosquito Legislation.**—*Proc. 11th Ann. Meeting New Jersey Mosquito Exterm. Assoc., 1924*, pp. 24–27. Atlantic City, N.J., 1924.

The anti-mosquito legislation passed in New Jersey since 1902, when the first measure was passed, and the benefits that have accrued from it are briefly reviewed.

Le Prince (J. A.). **Development of Mosquito Control in Southern States.**—*Proc. 11th Ann. Meeting New Jersey Mosquito Exterm. Assoc., 1924*, pp. 28–38. Atlantic City, N.J., 1924.

The progress made in anti-malarial work in the southern United States is reviewed. *Anopheles quadrimaculatus* is the cause of practically all the malaria in the southern States; both *A. crucians* and *A. punctipennis* are capable of carrying the disease, but they do not seem to be important in this connection in nature.

Mehrhof (F. E.). **Ditching Machinery.**—*Proc. 11th Ann. Meeting New Jersey Mosquito Exterm. Assoc., 1924*, pp. 51–55. Atlantic City, N.J., 1924.

Various types of ditching machines that have been tested and are in use since the description of similar apparatus last year [*R.A.E.*, B, xi, 95] are described.

Reiley (F.). **Cleaning Machinery.**—*Proc. 11th Ann. Meeting New Jersey Mosquito Exterm. Assoc., 1924*, pp. 56–58. Atlantic City, N.J., 1924.

Improved apparatus for the cleaning of salt marsh ditches is described; at present ditches are being cleaned by hand every year, but those cleaned by suitable machines do not require cleaning again for at least three years.

Rudolfs (W.). **Influence of External Conditions upon the Behaviour of Mosquitos.**—*Proc. 11th Ann. Meeting New Jersey Mosquito Exterm. Assoc., 1924*, pp. 58–64. Atlantic City, N.J., 1924.

The author has continued his previous work on substances attractive to mosquitos [*R.A.E.*, B, x, 190]. There are two possibilities of protection against mosquito bites, namely, obscuring attractive agents by certain materials, and direct repulsion by materials applied to the skin; the second of these seems at present to be of the greater economic value. It was frequently observed during the experiments that the insects subjected to the vapour of some volatile oils moved their legs so violently that they broke off at the joints of the trochanter and femur; the species experimented with were *Aëdes sollicitans*, *A. cantator* and *Culex pipiens*. The varying effects of many oils and other substances are noted. The reactions observed seem to indicate that certain sense organs may be present on the legs of mosquitos.

The behaviour of mosquitos as a result of atmospheric conditions is also discussed [*R.A.E.*, B, xii, 74]. In view of the frequent remark by practical workers that mosquitos avoid certain areas that are apparently eminently suitable for breeding, a study was made in a cedar swamp region where Anophelines, as well as *Aëdes vexans* (*sylvestris*) and *A. territans* occurred, from which it was clear that the chemical constituents of the water were not the factor influencing breeding. Water collected in the heart of the cedar swamp region was practically devoid of life, but as soon as the tributaries and streams of the region become wider, so that sunlight penetrated the surface growth, they are inhabited by microscopic animals and plants, and the essentials for life of the mosquito larva are present. The deductions are that food supply is

the main requirement for breeding and that the kind of food supply may induce certain species to breed in certain places. It is known that the type of protozoal and plant life present is determined by the changes in chemical composition of the water and subsequent difference in alkalinity and acidity; for this reason, laboratory experiments made to determine the resistance of larvae to different salts and acids have but little value if the food supply is not kept up. Larvae were kept alive for several days in very acid and in strongly alkaline natural waters containing organisms as food for them. Water from some very acid clay pits containing large amounts of alumina showed no larvae; examination indicated that this alumina clay is highly toxic to all growth, an observation that might lead to some practical results.

[**Anti-mosquito Work in 1923 in the north-eastern United States.**]—*Proc. 11th Ann. Meeting New Jersey Mosquito Exterm. Assoc., 1924*, pp. 80–115. Atlantic City, N.J., 1924.

The progress of mosquito control in various counties of New Jersey, New York and Connecticut during 1923 is described in a series of reports.

Cooling (L. E.). **A Mosquito Survey of Townsville.**—*Health*, ii, no. 6, pp. 165–172, 1 graph. Melbourne, November 1924.

Mosquito breeding in Townsville during the period under observation (following several months of dry weather) depended on domestic (household) water collections and other artificial breeding-places, such as a few collections of sewage. Except for *Aëdes notoscriptus*, only the domestic mosquitos, *A. argenteus* (*aegypti*) and *Culex fatigans* (*quinquefasciatus*) were observed, the former being the more numerous. These mosquitos breed in tanks, water-barrels, disused horse-troughs, roof gutters, etc. *C. fatigans* also breeds in stagnant sewage and the water-seals of acetylene gas generators. It is the vector of filariasis in Queensland, and the comparatively low filarial endemicity in Townsville (1·4 per cent. as compared with 4·9 per cent. in Brisbane) is attributed to the absence of difficulties in sewage-disposal. *A. argenteus* is active indoors, especially during the day and to a certain extent at night. These species continue breeding throughout the mild winter months, and they are rendered independent of weather conditions by the facilities afforded by their close association with man in the way of utilising tanks and minor collections of water, both in and out of doors. Adult Anophelines were not observed, nor *Aëdes vigilax*, which is dependent on tidal and weather conditions. In favourable seasons, however, the town suffers from swarm invasions of *A. vigilax*. The ordinary range of flight under these conditions would be on the average 3 miles. There is other evidence that *A. vigilax* in Queensland will travel ordinarily from 5 to 10 miles, probably 20 and even 40 miles.

Legendre (J.). **La zoophilie chez les moustiques et son application à la prophylaxie.**—*C. R. hebdom. Acad. Sci.*, clxxix, no. 23, pp. 1351–1353. Paris, 1924.

Continuing his investigations [*R. A. E.*, B, xii, 17] on the preferences of mosquitos for the blood of man or animals, the author introduced at Pons, where *Culex pipiens* and *C. hortensis* feed habitually on man,

a large number of eggs and larvae of *C. pipiens* from Brittany. Observations made a year later showed the adults to manifest the same repugnance for human blood, both in captivity and at liberty, as they exhibited in Brittany, and that they had apparently taken the place of the original man-attacking mosquitos.

Artom (C.). **La specie di *Gambusia* acclimatata in Italia (*Gambusia holbrooki* Grd.) in relazione colla stabilità del carattere del gonopodio.** [The Species of *Gambusia* acclimatised in Italy (*G. holbrooki*) in Relation to the Stability of the Character of the Gonopod.]—*Atti R. Accad. Naz. Lincei.*, Rend. Classe sci. fis., mat. e nat., xxxiii, 2 sem., no. 7–8, pp. 278–282, 1 fig. Rome, 1924.

In the United States the mosquito-destroying fishes of the genus *Gambusia* are distributed as follows: *G. holbrooki* in a zone between Virginia and Alabama; *G. patruelis* from Florida to Texas; and *G. affinis* from Florida to Tampico, Mexico. The species imported into Spain and Italy [*R. A. E.*, B, xii, 94] and now established there is *G. holbrooki*. In Italy the disproportion between males and females (100 males to 160 females) of this species is less marked than in the United States, and development is more rapid.

Takahashi (R.). **Insects Living in Hot Springs.**—*Dobutsugaku Zasshi* [*Zool. Mag.*], xxxvi, no. 433, pp. 475–481. [Tokyo] November 1924.

Various insects are recorded from hot springs in Formosa, including the larvae of *Anopheles maculatus*, which were found at temperatures up to 43°C. [109·4°F.].

Visbecq (—) & Lacaze (H.). **Le paludisme aux armées.**—8vo, 311 pp., 44 figs. Paris, Charles-Lavauzelle & Cie, 1924. Price *Frs.* 20.

This fully illustrated volume deals with all the varied aspects of the work of combating and preventing malaria, and estimates their value in the special circumstances of an army in the field, giving exact information on the way that they must be carried out in actual practice, including notes on the personnel and apparatus required. The advice is based on the authors' own experience in two eastern anti-malarial campaigns.

Balfour (A.). **Historical Aspects of Malaria.**—*Nature*, cxv, no. 2879, pp. 17–20. London, 3rd January 1925.

This extract from a discourse delivered at the Royal Institution traces the effect of malaria from the earliest times to date. It is shown how in the past the absence of any definite knowledge respecting this disease resulted in the decline of many nations, whereas to-day it is utilised for the treatment of other serious derangements, such as afflictions of the central nervous system.

GRASSI (B.). **Twenty-five Years After. A Chronicle of the Discoveries relating to the Mode of Transmission of Human Malaria.**—*Parasitology*, xvi, no. 4, pp. 355–364. Cambridge, December 1924.

An attempt is made to settle the controversy with regard to apportioning the credit for the discovery of the transmission of human malaria. The exact dates and data are quoted, with additional notes by the author.

ROSS (I. C.). **The Bionomics of *Ixodes holocyclus* Neumann, with a Redescription of the Adult and Nymphal Stages and a Description of the Larvae.**—*Parasitology*, xvi, no. 4, pp. 365–381, 1 pl., 2 figs. Cambridge, December 1924.

Ixodes holocyclus, Neum., is responsible for an extremely common fatal paralysis of dogs and cats in New South Wales and along the whole coastal region of Eastern Australia. The disease is especially prevalent in the spring and early summer, but may occur at any time of the year. Young foals, calves and lambs are also said to be affected, while fatal cases have been recorded among children [*R. A. E.*, B, xiii, 9]. The following is from the author's summary of this paper :—

I. holocyclus is a three host tick. It is found on native mammals, being abundant on *Perameles nasuta* (bandicoot), while it also occurs on dogs, cats and man, and exceptionally on the large bush opossum and the rat. The eggs hatch in 49–61 days in warm weather. The larvae become active in about 7 days and engorge on a host in 4–6 days. Larval metamorphosis is prolonged by cold, and is most rapid in warm weather, varying from 19 to 41 days. Nymphs harden and are quiescent for about 7 days and engorge in 4–7 days. Adults emerge from the nymphal skin in 21–71 days. Pairing occurs away from the host and may last 11 days. Adults harden and seek the host in about 7 days and engorge in 6–21 days. Males are only rarely found on hosts and have never been found attached or showing signs of engorgement. Oviposition begins 11–20 days after the female leaves the host, and may last 16–34 days, the number of eggs laid being about 1,800–2,500. All stages are soon killed by desiccation, gorged nymphs and larvae being very soon killed even at moderate temperature. A mass infestation with *Ixodes holocyclus* has not been seen either on native or domesticated animals.

MACGREGOR (M. E.). **Tests with *Chara foetida* and *C. hispida* on the Development of Mosquito Larvae.**—*Parasitology*, xvi, no. 4, pp. 382–387. Cambridge, December 1924.

In these experiments 50 larvae of *Anopheles bifurcatus* at different instars were introduced into a trough containing water from the stream where the larvae were collected and filled with a mass of *Chara foetida* and *C. hispida*. The water showed a constant pH reading of 8 and a mean temperature of 68°F. The only possible difference in the development of these larvae and those remaining under natural conditions was that the adults in the former were slightly larger. This may be due to a better food supply, for it was noticed that a copious bacterial and calcium carbonate scum formed constantly on the surface of the water in which the *Chara* grew. The author, however, states that this scum

had to be repeatedly broken up to enable the youngest larvae to get air at the surface. These experiments were repeated, the temperature of the water and the air being raised to 75–80°F., but except for the fact that the growth of the plants and the larvae was accelerated, the results were similar, and no toxic action on the larvae could be observed. An extract of *Chara* was then tried, 1 cc. of which represented 40 grammes of the air-dried plant. This was diluted with fresh stream water to 1 : 250 to 1 : 1,000, and batches of 20 larvae of *A. bifurcatus* were placed in each dilution. Even under the strongest concentration (1 : 250) the larvae developed normally. The extract was also tested against *Culex pipiens* (the water in this case was from a horse trough where the larvae were collected), but again no toxic action was noticeable. In water containing living *Chara*, larvae of *C. pipiens* did not thrive, though some emerged as undersized adults. The author does not consider this to be due to any toxic action on the part of the plants, but to unusual environment—water of an alkaline reaction instead of one with an acid reaction and absence of decomposing organic matter. In all experiments of this type it is most important that the reaction of the water shall agree with the normal reaction of the water that forms the usual habitat of the larvae of the particular species used.

Taking the evidence as a whole, it is difficult to conclude whether *Chara* is entirely devoid of the larvicidal action imputed to it or whether under certain conditions, and in certain localities, some species have the power of inhibiting mosquito development, but the author is convinced by his own experiments and observations that even some of the reputedly toxic species are often devoid of any toxicity whatever. Certainly *Chara* can have no generally useful application in practical anti-mosquito measures. The presence of *Chara* did not prevent oviposition either under experimental or natural conditions. In this connection the species already mentioned were used and also *Anopheles maculipennis* and *Aëdes* (*Ochlerotatus*) sp.

MacGregor (M. E.). **Special Apparatus and Technique for the Study of Mosquitoes and other Aquatic Insects.**—*Parasitology*, xvi, no. 4, pp. 388–397, 7 figs. Cambridge, December 1924.

Descriptions are given of pipettes for removing mosquito larvae from containers and for the collection of tree-hole breeding mosquitos, of rearing dishes, and of special creosote bottles for storage boxes. The methods of keeping mosquitos, including those infected with malaria, rearing individuals, killing preparatory to mounting, etc., are discussed.

Kessel (Q. C.). **Notes on the Streblinae, a Subfamily of the Streblidae (Diptera Pupipara).**—*Parasitology*, xvi, no. 4, pp. 405–414, 8 figs. Cambridge, December 1924.

In an introductory note by Dr. H. Scott, it is stated that most of the species of the family Streblidae are parasites on bats (the present paper containing one record of *Euctenodes mirabilis*, Waterhouse, from an opossum, *Glironia venusta*, and *Strebla avium* being recorded from doves and parrots). The systematic position of the family is reviewed.

By redescribing *Strebla vespertilionis*, F., and *Euctenodes mirabilis* the author has attempted to clear up the confusion between the two genera. *E. tonatiae*, sp. n., is described from Ecuador from *Tonatia brasiliensis*.

ROSEWALL (O. W.). **An Interesting Parasite of a Praying Mantid (Dip., Orth.).**—*Ent. News*, xxxv, no. 10, pp. 370–371. Philadelphia, Pa., December 1924.

An observation is recorded of 10 larvae of *Sarcophaga flavipes*, Aldr., emerging from the body of a female Mantid, *Stagmomantis carolina*, Johanns. This is thought to be a new host record for this fly.

KNOWLES (R.), NAPIER (L. E.) & SMITH (R. O. A.). **On a *Herpetomonas* found in the Gut of the Sandfly, *Phlebotomus argentipes*, fed on Kala-Azar Patients. A Preliminary Note.**—*Indian Med. Gaz.*, lix, no. 12, pp. 593–597. Calcutta, December 1924.

The sand-flies so far found in Calcutta are *Phlebotomus minutus*, *P. minutus niger*, *P. argentipes* and *P. squamipleuris*. *P. argentipes* was not found until July, and was especially prevalent in the endemic areas of kala-azar in September and October. The favourite host of *P. minutus* appears to be the gecko, and it has not up to the present been induced to feed on man.

The results of feeding *P. argentipes* on man are described, and the following are the authors' conclusions : In ten out of eleven consecutive experiments, female laboratory-bred *P. argentipes*, fed upon the parasite-containing blood of kala-azar patients, showed typical herpetomonad forms in the fore-gut or mid-gut at the third to the fifth day after the feed. No less than 25 out of 56 such fed flies showed herpetomonads, and in six instances the infection was a heavy one, although the patients' blood films had shown only scanty *Leishmania donovani* to be present. On dissection and examination of 811 control sand-flies, including both *P. minutus* and *P. argentipes*, the only natural infections encountered have been once a *Rickettsia*, three times a *Bodo*, and once a doubtful spirochaete. Nothing resembling a herpetomonad has been found. On dissection and examination of 46 other control female *P. argentipes* fed upon persons not suffering from kala-azar, no protozoa were found.

It is concluded that *L. donovani* passes into its flagellate form in the gut of *P. argentipes* under suitable conditions of atmospheric temperature and humidity. Any further conclusions with regard to the kala-azar transmission problem, however, are at present carefully avoided pending the results of further work which is now in progress.

AVARI (C. R.) & MACKIE (F. P.). **Canine Leishmaniasis in Bombay.**—*Indian Med. Gaz.*, lix, no. 12, pp. 604–605, 1 fig. Calcutta, December 1924.

This is apparently the first record of leishmanial infection in a dog in India. It is pointed out that Bombay is not an indigenous centre for either oriental sore or kala-azar, and the absence of the canine disease in the highly endemic areas of Assam, Bengal and Madras is strongly against there being any causative relationship between the two diseases.

EGEN (G.). **Die protozoäre Parasitenfauna der Stechfliege** *Stomoxys calcitrans*. [The Protozoal Parasites of *S. calcitrans*.]—*Zool. Jahrb.*, Abt. Anat., xlvi, pt. 3, pp. 389–472, 10 pls. Jena, 1924.

In spite of the part played by blood-sucking Diptera in relation to disease in the tropics, their possible importance in this respect in colder countries has been very little studied. The author selected *Stomoxys calcitrans* for his investigations as it was the commonest and most readily available blood-sucking fly. For the sake of comparison tables are given showing the parasites harboured by non-blood-sucking insects, and the various animal diseases in which biting flies are known to be implicated. The author deals with the parasites found in *S. calcitrans* under two headings: firstly, those found generally under varied circumstances, which are probably normal parasitic fauna; secondly, parasites from flies that have fed on diseased cattle. *Herpetomonas* (*Leptomonas*) *stomoxyae* has only been found in *S. calcitrans*, but it probably has another host. It is met with in greater numbers in the higher altitudes of the Alps than in the valleys. The mode of infection is unknown. The parasites were not found in the larvae, but may be acquired by them, perhaps from their food (animal manure, or possibly substances in the manure), as parasites were found in the pupae. The herpetomonad, leptomonad and crithidial forms are extremely variable, and certain individuals reared on artificial media are capable of transforming into trypanosome forms. The stages and development of the parasite in the fly are described.

Crithidia haematopotae, sp. n., is described from *S. calcitrans* and *Haematopota pluvialis*, occurring chiefly in the latter. It is not known whether the flies are the only or the intermediate host, but it is not pathogenic to them. Its various stages are described.

The individual flies examined during these experiments were collected from Alpine stables in Switzerland, and the parasites found in them may be taken as those normally harboured by *S. calcitrans*.

Subsequently the author also obtained 1,000 flies that had fed on cattle infected with foot-and-mouth disease, which were compared with 1,000 fed on healthy ones. The early stages of parasitic infection in both sets of flies were particularly difficult to recognise.

The technique employed is described. Parasites (haemosporidia, sometimes apparently encysted, trypanosome-like forms and ookinetes) were found in 5 flies, all of which were from diseased animals, but obtained from different localities and at different periods. Their distribution in the fly is described. The trypanosome-like forms observed in some cases in the intestine may have developed from the spores. The author points out that there are peculiarities in haemosporidia reminiscent of trypanosomes, and trypanosomes cultured artificially show peculiarities reminiscent of haemosporidia. A parallel may be drawn with the developmental forms (herpetomonads) of the parasite of kala-azar [*Leishmania donovani*] in cultures.

Infection with the ookinetes was experimentally produced in *Anopheles bifurcatus* by feeding on diseased animals.

The blood corpuscles ingested by the fly may be attacked by the parasites in the gut of the fly, or be already infested in the vertebrate host without the parasite developing further there. If the latter is the case, an intermediate host is essential, and would doubtless prove to

be *S. calcitrans* or some mosquito. It cannot yet be stated whether the parasites are directly related to the cause of the disease.

Another organism isolated from *S. calcitrans* was a spirochaete, which is provisionally named *Spirochaeta stomoxyae*, sp. n., and described at length. It only occurred in two flies, and though both had fed on diseased animals it cannot at present be connected with foot-and-mouth disease. It is presumably non-pathogenic to the flies.

Breeding experiments with the various parasites are still being carried out. The biological and anatomical details of *S. calcitrans* essential to these studies are described in detail.

Ross (W. C.) & Hussain (M.). **On the Life History of** *Herpetomonas muscae-domesticae*. **A Preliminary Note.**—*Indian Med. Gaz.*, lix, no. 12, pp. 614–615. Calcutta, December 1924.

A detailed account of these experiments and observations is to be published later. Of some 7,000 flies examined about 50 per cent. proved to be infected. The observations were made throughout on living preparations from flies in citrated saline solution, and were confirmed by a large number of stained specimens showing the various stages of the life-history. The facts established are as follows:—*Herpetomonas* is a tissue parasite, not an intestinal one. The flagellate stage is an ephemeral one, lasting for a period of not more than 6 hours, and often less. The function of this stage is one of sexual reproduction. The parasite, after entering the fly's intestine in its infective "spore stage," penetrates the intestinal wall and upper part of the intestine, and reaches the loose areolar tissue under the lining membrane of the intestine, in which it divides by fission, multiplies, and grows to maturity. The process of growth in the tissue usually occupies three days, at the end of which period the mature flagellate bores its way back to the lumen of the gut. On emerging into the lumen of the gut a process of sexual conjugation takes place almost at once, and cannot usually be observed after a lapse of 15 minutes after the migration of the parasite. After one to two hours, during which the macronucleus divides and gives origin to a number of minute spherical spores, a process of "spore extrusion" takes place, which lasts for about ten minutes, during which time the flagellate undergoes various contorted movements. These spores are present in enormous numbers in the lower gut of infected flies, and they undoubtedly constitute the infective stage of the parasite, are resistant to a hostile environment, and capable of withstanding exposure.

The stages of development of *Herpetomonas* may be summarised as follows: minute spores (the infective stage); larger spores (the penetrating stage); binucleate bodies, torpedo-shaped bodies, preflagellate bodies of various sizes, and immature flagellates with developing flagella (all in the tissues); mature flagellates (which migrate into the intestine to complete their sexual life-history). The authors have observed all these stages in the four varieties of *Herpetomonas* so far found in flies and also in cultures of kala-azar parasites [*Leishmania donovani*].

In an editorial footnote it is pointed out that the authors' views are somewhat revolutionary, but that they are convinced of the accuracy of them.

FERRIS (G. F.). **Some Diptera Pupipara from the Philippine Islands.**—*Philipp. Jl. Sci.*, xxv, no. 4, pp. 391–403, 7 figs. Manila, October 1924.

The material dealt with includes 5 species, 4 of which have been taken from bats and are redescribed and figured. The fifth species is a Hippoboscid, *Ornithophila maquilingensis*, sp. n., which was taken in flight.

STAMMER (H. J.). **Die Larven der Tabaniden.** [Tabanid Larvae.]—*Zts. wiss. Biol.*, Abt. A. *Zts. Morphol. Ökol. Tiere*, i, no. 1, pp. 121–170, 2 pls., 20 figs. Berlin, 17th April 1924.

Descriptions are given of the morphology of the larvae of *Chrysops*, *Tabanus* and *Hexatoma*, with details of various organs and short biological notes. A bibliography is appended of the literature dealing with the early stages of TABANIDAE.

SURCOUF (J. M. R.). **Description d'une espèce nouvelle de *Pangonia* paléarctique.**—*Encyclopédie entom.*, Sér. B. ii, Dipt. i, p. 65. Paris. Lechevalier, 1924.

Pangonia krausei, sp. n., is described from Sardinia.

BODENHEIMER (F. S.). **Ueber die Voraussage der Generationenzahl von Insekten. II. Die Temperaturentwicklungskurve bei medizinisch wichtigen Insekten.** [The Prediction of the Size of the Brood in Insects. II. The Temperature Development Curve in Insects of medical Importance.]—*Centralbl. Bakt. Paras. Infekt.*, Ite. Abt. Orig., xciii, no. 6, pp. 474–480, 9 curves. Jena, 5th December 1924.

This paper gives a number of curves showing the duration of development (under optimum conditions) at various temperatures for the following insects of medical importance: *Culex pipiens*, L., *Aëdes geniculatus*, Ol. (*Culicada ornata*, Mg.), *Aëdes argenteus*, Poir. (*Stegomyia fasciata*, F.), *Anopheles maculipennis*, Mg., *Musca domestica*, L., *Pediculus humanus*, L. (*hominis*, L.), *Pulex irritans*, L., and *Cimex lectularius*, L.

GABERT (A.). **L'hypoderme du bœuf.**—*La Vie agric. & rur.*, xxv, no. 52, pp. 431–432, 1 fig. Paris, 27th December 1924.

A brief account is given of the ox warbles, *Hypoderma*, and the methods in use against them, removal of the larvae being considered the most satisfactory measure. The estimated annual loss on hides in France is 11 million francs.

FORSIUS (R.). **On Ceratopogoninae as Ectoparasites of Neuroptera.**—*Notulae entomologicae*, iv, no. 4, pp. 98–99. Helsingfors, 20th December 1924.

There are few European records of Ceratopogonines attacking Neuroptera, though several species are attacked by *Forcipomyia* (*Euforcipomyia*) *eques*, Joh., in North America. This midge, hitherto known only from North America, is, however, not rare in Finland on *Chrysopa perla*, L., and *C. phyllochroma*, Wsm.

ANDERSON (T. J.). **Blood-sucking Insects and their Allies in the Colony and Protectorate of Kenya.**—*Kenya Med. Jl.*, Suppt., 14 pp. Nairobi, August 1924.

This list of blood-sucking insects, ticks and mites affecting man and domestic animals in Kenya Colony is merely a summary of present knowledge, and does not exhaust either the species found or the distribution of known species. With the exception of the tsetse-flies, the authentic recorded localities are given.

ANDERSON (T. J.). **Ectoparasites recorded from Kenya Colony and Protectorate with their Hosts.**—*Kenya Med. Jl.*, Suppt. no. 2, 8 pp. Nairobi, September 1924.

This list includes the ectoparasites of man and of domestic and wild animals.

WOLF (J.). **Contribution à la morphologie des bactéroïdes des Blattes** (*Periplaneta orientalis* **L.**).—*C.R. Soc. Biol.*, xci, no. 34, pp. 1180–1182. Paris, 5th December 1924.

Observations on the structure, shape and size of the bacteroid bodies in the cockroach, *Periplaneta orientalis*, L., are given as a step to solving the problem whether these bodies in insects are true bacteria.

WOLF (J.). **Contribution à la localisation des bactéroïdes dans les corps adipeux des Blattes.**—*C.R. Soc. Biol.*, xci, no. 34, pp. 1182–1183. Paris, 5th December 1924.

The title of this paper indicates its contents.

GOODWIN (E. St. G. S.). **The Cockroach.**—*Jl. R.N.M.S.*, xi, no. 1, pp. 23–30. London, January 1925.

The object of this paper is to draw attention to the danger of cockroaches as possible disseminators of disease and to point out various methods for their destruction. The existing knowledge on this subject is briefly reviewed, and the need for more detailed study is urged.

THOMPSON (A. G. G.). **Barley Itch.**—*Brit. Med. Jl.*, no. 3341, p. 71. London, 10th January 1925.

The mite, *Pediculoides ventricosus*, Newp., is again recorded [*R. A.E.*, B, xiii, 3] as causing dermatitis among dock labourers engaged in unloading barley from Morocco at Southampton and other ports. A mechanical elevator used at Sharpness created so much dust that it was blown into cottages near by and infected all the inhabitants.

Freely dusting the body and inside the clothes with flowers of sulphur is recommended as a preventive measure, and a hot soda bath relieves the irritation.

Blazy (M. C.). **Considérations sur les rapports de la faune des rongeurs avec les manifestations pesteuses à Dakar.**—*Bull. Soc. Path. exot.*, xvii, no. 9, pp. 834–845. Paris, 1924.

Investigations in Dakar show that human plague increases with rat plague and that it decreases with the destruction of these rodents. Almost the only flea found on rats is *Xenopsylla cheopis*. *Tunga* (*Sarcopsylla*) *penetrans* is very rarely met with.

Legendre (J.) **Sur l'existence de** *Phlebotomus perniciosus* **en Saintonge.**—*Bull. Soc. Path. exot.*, xvii, no. 10, pp. 894–896. Paris, 1924.

Phlebotomus perniciosus is recorded from Saintonge (Charente Inférieure). Should dengue be introduced into Saintonge, even though these midges might prove capable of transmitting the virus, serious epidemics are not likely to occur, as in this locality they are only on the wing for about 6 weeks (July to August).

Escomel (E.). **Essai sur la Parasitologie d'Aréquipa (Pérou) et de ses environs.**—*Bull. Soc. Path. exot.*, xvii, no. 10, pp. 906–925, 2 figs. Paris, 1924.

These notes are the result of observations extending over a period of 15 years and are intended mainly as an introduction to the study of Peruvian parasitology. Owing to the altitude and the dryness of the district under consideration, the disease-carrying invertebrates are very limited. The insect-borne diseases recorded are recurrent fever, caused by *Spirochaeta* (*Treponema*) *recurrentis*, and conveyed by *Pediculus capitis*, DeG., and *P. humanus*, L. (*corporis*, DeG.), and possibly by the ticks, *Ornithodorus megnini*, Dugés, and *Argas persicus*, Oken; leishmaniasis; and trypanosomiasis [*R. A. E.*, B, viii, 65]. The last two, however, are usually contracted in the tropical regions of Peru. Malaria is not indigenous in the town of Aréquipa, though it is prevalent in the neighbouring valleys, where *Plasmodium malariae*, *P. vivax* and *P. praecox* (*falciparum*) have all been recorded. The Anophelines occurring in the valleys do not ascend above an altitude of about 6,000 ft., and the only mosquito is *Culex escomeli*, Brèthes, which is found at about 8,000 ft. An aquatic plant of the genus *Lemna* causes a dense growth on the water surface and thus interferes with the respiration of the larvae of this species. Other noxious insects, etc., are *Demodex folliculorum*, Simon, *Sarcoptes scabiei*, DeG., *Phthirus* (*Phthirius*) *pubis*, L. (*inguinalis*, Leach), *Cimex lectularius*, L., *Triatoma infestans*, Klug, fleas (rarely found), *Tabanus fulvipes*, Phil., and *Simulium escomeli*, Roub.

Castellani (A.). **Observations on some Diseases of Central America.**—*Jl. Trop. Med. & Hyg.*, xxvii, no. 1, pp. 1–14, 19 figs., 1 pl. London, 1st January 1925.

The author considers that coast erysipelas in Guatemala [*R. A. E.*, B, vii, 159], filarial nodules, and certain eye-symptoms, sometimes producing total blindness, are all connected with infestation by a filaria described by Brumpt as *Onchocerca caecutiens*, which may, however,

be identical with *O. volvulus*. According to Calderon's recent researches *Culex* appears to be a likely vector. Myiasis in Central America is due to *Dermatobia hominis*, Say, the eggs of which are carried by the mosquito, *Psorophora* (*Janthinosoma*) *lutzi*, Theo. *Microthrombidium* (*Trombicula*) *tlalzahuatl*, Murray, is a troublesome mite [*R. A.E.*, B, xii, 65], found principally in the low country in Central America, especially near the coast.

Nuñez Tovar (M.). **Mosquitos y Flebotomos** [Sandflies] **de Venezuela.** —*Trab. Contrib. 4° Congreso Venez. Med.*, 46 pp., 10 pls. Caracas, 1924.

The mosquitos and sandflies (*Phlebotomus*) found in Venezuela are described and illustrated so as to permit of ready identification. The local distribution and, where necessary, the synonymy are given for each species. The Anophelines recorded as new to Venezuela, and additional to a previous list [*R. A.E.*, B, ix, 13] are *Anopheles maculipes*, Theo., *A. punctimacula*, D. & K., and *A. mediopunctatus*, Theo.

Nuñez Tovar (M.). **Indice Dipterologico de Venezuela.**—*Trab. Contrib. 4° Congreso Venez. Med.*, 14 pp. Caracas, 1924.

This list of mosquitos, Tabanids and blood-sucking Muscids found in Venezuela comprises 116 species, for each of which the geographical distribution within the republic is given.

Dyar (H. G.) & Shannon (R. C.). **New Mosquitoes from Brazil (Diptera, Culicidae).**— *Jl. Wash. Acad. Sci.*, xv, no. 2, pp. 39–41. Baltimore, Md., 19th January 1925.

The new species described are *Sabethoides glaucodaemon*, *Culex* (*Choeroporpa*) *bequaerti*, *Taeniorhynchus* (*Mansonia*) *indubitans* and *Anopheles celidopus*.

Hosselet (C.). **Les oenocytes de** *Culex annulatus* **et l'étude de leur chondriome au cours de la sécrétion.**—*C. R. hebdom. Acad. Sci.*, clxxx, no. 5, pp. 399–401. Paris, 1925.

The function of the oenocytes in *Theobaldia* (*Culex*) *annulata* and their relation to development and metamorphosis are discussed.

Nath (V.). **Egg-follicle of** *Culex*.—*Qtrly. Jl. Micros. Soc.*, lxix, no. 273, pp. 151–175, 2 pls. London, December 1924.

An account is given of the development of the egg-follicle of *Culex fatigans*.

Larrousse (F.). **Larve de** *Culex* **à branchies très développées nouvelle pour la faune française** (*Culex lavieri* **n. sp.**).— *Ann. Paras. hum. & comp.*, iii, no. 1, pp. 68–70, 1 fig. Paris, January 1925.

The larva of *Culex lavieri*, sp. n., is described from Upper Savoy. The adult is not known. The larva is characterised by the unusual development of the respiratory branchiae.

RUDOLFS (W.). **Mosquito Breeding in Specific Places.**— *Jl. Parasit.*, xi, no. 2, pp. 79–83. Urbana, Ill., December 1924.

Much of the information contained in this paper has appeared as part of a previous one [*R.A.E.*, B, xiii, 25].

KUDO (R.). **Studies on Microsporidia parasitic in Mosquitos. vi. On the Development of** *Thelohania opacita*, **a Culicine Parasite.**— *Jl. Parasit.*, xi, no. 2, pp. 84–89, 1 fig., 1 pl. Urbana, Ill., December, 1924.

The development of *Thelohania opacita* in larvae of *Culex apicalis* (*testaceus*), *C. territans* and another species is described. The infection was fatal to the larvae in the cases observed.

MATHESON (R.). **The Culicidae of the Douglas Lake Region (Michigan).** —*Canad. Ent.*, lvi, no. 12, pp. 289–290. Orillia, Ont., December 1924.

In this list of the mosquitos from collections made during July and August, the dominant Anopheline was *Anopheles maculipennis*, Meig. *A. quadrimaculatus*, Say, was not found.

FISHER (H. C.). **Report of the Health Department of the Panama Canal for 1923.**—95 pp. Mount Hope, C.Z., 1924. [Received 10th January 1925.]

The anti-mosquito work for the year is reviewed. In some cases, where repeated observations only revealed the presence of *Anopheles eiseni*, oiling was abandoned and the trees were allowed to grow along the banks of the streams to produce dense shade. This species is of distinctly sylvan habits and always breeds in clean, shaded water free from algae. It is not caught in houses and does not leave the jungle, and although its malaria-carrying propensities are not known, it may be safely disregarded in the vicinity of Gatun. The Anophelines of the *A. albimanus* and *A. tarsimaculatus* group are the important carriers of malaria in Panama, the other 7 or 8 species known to exist being of relatively small importance. *A. tarsimaculatus* was found breeding in a brackish swamp in a former pasture, which is now being drained. *Chara foliolosa*, which provided a favourable shelter for mosquito larvae in a lake [*R.A.E.*, B, xii, 76], has practically disappeared with the last rainy season, at least from the surface of the water, but its reappearance is expected as a result of the clearer water and sunshine of the dry season. Top minnows are present in all suitable Isthmian waters; several species feed voraciously on mosquito larvae in the laboratory. A number of these, identified as *Poecilia sphenops*, were supplied to Dr. P. A. Buxton on his way to Samoa. They survived the journey in 5-gallon kerosene tins, the water being changed only once daily, except on very hot days. They were fed on toast crumbs, grated fresh lettuce and rubbed up liver. They will no doubt prove effective against tank-breeding mosquitos.

SWELLENGREBEL (N. H.). **Nog een opmerking over de dichtheid der Anophelinen bevolking om Amsterdam.** [A further Note on the Density of the Anopheline Population around Amsterdam.]—*Nederl. Tijdschr. Geneesk.*, lxviii, 2nd Half, no. 25, pp. 3120–3124. Amsterdam, 1924.

This is a discussion of criticisms of a paper already noticed [*R.A.E.*, B, xii, 175], the author concluding that there is no reason to modify his statement regarding a decrease of Anophelines in 1922 followed by an increase in 1923.

SWELLENGREBEL (N. H.). **Malaria in the Kingdom of the Netherlands.**—*Report Malaria Sub-Committee League of Nations*, 72 pp., 8 charts. Geneva, n.d. [Received 29th January 1925.]

A good deal of the information contained in this report has already been noticed [*R.A.E.*, B, xii, 174–176; 192–193, etc.]. It is probable that the incidence of malaria in Holland in former centuries was greater than at present and the quartan form more prevalent. The decline in the incidence of the disease has probably been general. That observed in various localities is discussed, and a series of tables and graphs shows the frequency of *Anopheles maculipennis* in human habitations and stables around Amsterdam.

In north Holland domestic animals are less numerous than in other low-lying provinces (in comparison with the numbers of the inhabitants), but the author is not prepared to accept this fact as an explanation of the less complete disappearance of malaria in that region, as there are reasons for believing that the presence of domestic animals may have an undesirable effect from an epidemiological point of view. The usual anti-malarial measures are recorded as having been practised during the recent campaigns, including the killing of adult mosquitos while in hibernation in stables and outhouses, but the author does not consider it even probable that the sudden and general decline of the epidemic in 1923 can be attributed to this work.

DEEKS (W. E.). **Prevention and Treatment of Malaria.**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 2, pp. 21–26. London, 15th January 1925.

The introduction of malarial infection (chiefly by inoculation) into patients suffering from general paralysis, etc., has rendered possible accurate observations regarding immunity and other phases of the malaria problem. The degree of resistance to the disease was found to vary greatly in different individuals, particularly those who had lived in the tropics for some time. In some cases infection failed after four inoculations; practically all cases bitten by infected mosquitos developed malaria, though two failures have been reported.

CRAN (J.). **The Results of the Noguchi Treatment of the Prophylactic Measures employed in the 1923 Yellow Fever Epidemic in Belize.**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 2, pp. 26–29. London, 15th January 1925.

During a sudden epidemic of yellow fever in a large secondary school at Belize, British Honduras, sulphur fumigation was carried out, using 2 lb. of sulphur per 1,000 cu. ft., the fumigation being done in sections, the inmates being removed from one building to another as required.

Fresh cases still occurred, and the college was then evacuated for 10 days and the whole building thoroughly fumigated, after a preliminary burning of sulphur in the open space between the main building and in the verandahs, in order to drive mosquitos from these places into the building. This was entirely successful, and the epidemic ceased.

WATSON (M.). **Observation on Malaria Control, with special Reference to the Assam Tea Gardens, and some Remarks on Mian Mir, Lahore Cantonment.**—*Trans. R. Soc. Trop. Med. & Hyg.*, xviii, no. 4 (Oct.), pp. 147–161, 15 figs. London, December 1924.

The author describes his work on malaria control in tea estates in Upper Assam. During January and February the Anophelines caught were *Anopheles fuliginosus, A. minimus, A. hyrcanus* (*sinensis*), *A. maculatus, A. gigas, A. vagus* (*rossi* var. *indefinitus*) and *A. barbirostris*. The chief work was planned against *A. maculatus* and *A. minimus*, the two most dangerous malaria carriers. The most important anti-malarial measures were drainage, oiling, and dosing the children with quinine.

HAWORTH (W. E.). **Mosquitoes and Coconut Palms. A Mosquito Survey of Palm Trees in East Africa and the Problems resulting therefrom.**

EDWARDS (F. W.). **An Appendix describing two new Species of Mosquitoes from Coconut Palms in East Africa.**—*Trans. R. Soc. Trop. Med. & Hyg.*,xviii, no. 4 (Oct.), pp. 162–198., 4 pls. London, December 1924.

A study of malaria conditions in the town and district of Tanga, Tanganyika Territory, has led to the conclusion that mosquitos breed in the crowns of coconut palms almost continuously throughout the year, even in times of comparative drought, when collections of storm water have subsided and when those in rot-holes of trees have evaporated. The majority of mosquitos collected from coconut palms were biting ones, and at all stations the proved disease-carriers predominated. At Tanga the most plentiful species was *Culex fatigans*; at Dar-es-Salaam it was *Aëdes argenteus*. The crowns of the palms appear to act as reservoirs from which other suitable places may be stocked whenever these appear from rainfall or other causes. Although no definite figure can be quoted as the daily output of adult mosquitos per palm, it is considered as scarcely likely to be less than one, and probably much higher. What has been demonstrated for a portion of the east coast of Africa is probably taking place in tropical lands throughout the world wherever the coconut palm flourishes. No successful anti-mosquito campaign can therefore ignore the coconut palm, as, although it may prove uninhabited, it is always a potential nursery for disease-bearing insects.

No large-scale tests of treating the crowns with oily or other larvicidal substances have been possible, but this would probably prove impracticable owing to the labour involved and the periodical mechanical damage to the crowns that would be sure to occur. The ideal measure would seem to be to clear the coconut palms from all inhabited areas, both European and native. As this would be economically impossible, it is suggested that the planting of coconuts should be prohibited within the township areas; that all Government-owned palms should be

immediately removed from such areas; that owners and occupiers should be required to provide a sufficiently extensive cleared area for the housing of all employees; and that natives should be encouraged to build in more open spaces and to avoid the vicinity of these palms.

Three new species of *Aëdes* were encountered in the course of this survey; these are *A. haworthi*, Edw. [*R. A.E.*, B, xi, 117] and *A. calceatus*, sp. n., and *A. soleatus*, sp. n., of which descriptions are given in the appendix.

KLIGLER (I. J.). **Flight of *Anopheles* Mosquitoes.**—*Trans. R. Soc. Trop. Med. & Hyg.*, xviii, no. 4 (Oct.), pp. 199–202. London, December 1924.

Under constant wind conditions, the distance of spread of Anophelines from their breeding-place appears to vary directly with the intensity of breeding and inversely with the density of settlements in the neighbourhood of the breeding-place. Predictions with regard to a given place should be made only after these two variables have been definitely established by observation. As a general rule, however, the standard distance for routine control should not be less than 1½ miles. The prevailing wind is undoubtedly also of importance, but in Palestine there is usually a period of quiescence towards evening, when mosquitos are on the wing in search of food.

LLOYD (Ll.) & JOHNSON (W. B.). **[Note on the Trypanosome Infections of Tsetse-flies in Northern Nigeria.]**—*Trans. R. Soc. Trop. Med. & Hyg.*, xviii, no. 4 (Oct.), pp. 225–227. London, December 1924.

In replying to Duke's criticism of their former work [*R. A.E.*, B, xii, 160] the authors point out that they did not suggest that the labial cavity plays any part except that of a passage by way of which the proventricular type of trypanosomes reach the salivary glands of *Glossina*. The real point about these migrating forms in the labial cavity is that Duke refers all the infections to their groups by inference from the location of the trypanosomes in the fly alone and without reference to their morphology. The authors disagree with this because an infection involving gut and proboscis might be (1) one of the *brucei-gambiense* group, *T. congolense* or *T. grayi* in the gut with *T. congolense*, *T. vivax* or the migrating forms of the *T. brucei-gambiense* group in the proboscis, or; (2) any complex of these. For statistical purposes the recognition of the double infections, especially where one of the *T. vivax* group occurs with one of the *T. congolense* group, is important. With regard to their methods of dissection, the authors uphold these as requiring very little more time and as being more thorough, the elements of the proboscis being so fully exposed that (perhaps as a result) they have been able to record very heavy percentage infections of *G. morsitans* in Nigeria compared with those recorded for that species in Nyasaland, and for the closely allied *G. swynnertoni* in East Africa. In the cutting of the salivary glands in dissection a few flagellates may escape, but the great majority will remain *in situ*. The fact that the hypopharynx is the site of establishment of infective forms is not a new observation, as it was clearly demonstrated by Bruce and his co-workers in Nyasaland in 1913 that in these groups the fly is not infective until invasion of the hypopharynx has occurred.

DUKE (H. L.). **Polymorphic Trypanosomes of the *T. brucei* Group recovered from the Mwanza Sleeping Sickness Area.**— *Ann. Trop. Med. & Parasit.*, xviii, no. 4, pp. 415–435. Liverpool, 30th December 1924.

In the first part of this paper an account is given of the maintenance of the three trypanosome strains in the laboratory, their morphology and animal reactions, as well as an account of transmission experiments with laboratory-bred *Glossina palpalis*. The second part is a review of the data hitherto obtained on the effects of direct transmission of trypanosomes and the conclusions resulting from them [*cf. R.A.E.*, B, xi, 63, 190 ; xii, 151].

The strains dealt with in the first part were obtained from man in the sleeping-sickness area in the neighbourhood of Mwanza [*R.A.E.*, B, xi, 52] and from wild *Glossina swynnertoni*. After being subjected to direct transmission in laboratory animals over a prolonged period, the Mwanza human strain could still produce posterior-nuclear forms, though it had lost the power of cyclical development in the fly ; it is, however, not quite clear whether the two processes are entirely independent. In laboratory tests the Mwanza human trypanosomes are indistinguishable from *Trypanosoma brucei*. The strain from *G. swynnertoni* was essentially identical in behaviour in laboratory animals. It is noteworthy that the direct transmission strain and the antelope strain previously dealt with by the author ceased to produce posterior-nuclear forms in guineapigs in the later stages of upkeep in the laboratory. It has been suggested that these strains are descendents of trypanosomes that were capable of infecting man and that they assumed certain of the characteristics of *T. brucei* as the result of long and intimate association with the antelope (situtunga). If this is correct, their power of producing posterior-nuclear forms, being a comparatively recent acquisition, was soon lost, whereas in the case of the Mwanza strain the characters of *T. brucei* persist longer under radical changes of environment. These studies also show that increase of the virulence of a strain of trypanosomes is not necessarily associated with the formation by the strain of posterior-nuclear forms in suitable animals.

In the course of transmission experiments with laboratory bred *G. palpalis* and the Mwanza human and fly strains shortly after their arrival at the laboratory, 1,482 flies were dissected ; of these, only 6 contained flagellates. In every case the organisms were exceedingly scarce and were only revealed by a careful search of the freshly teased gut, sometimes only 2 or 3 flagellates being seen. They must be regarded as abortive attempts at development by a strain that has all but completely lost its power of maintaining itself in the alimentary canal of *Glossina*. When a normal fly-strain of trypanosomes is exposed to tsetse, the trypanosomes die out at once in the majority of the flies ; but in a minority, development proceeds uninterruptedly until the gut of the insect is swarming with flagellates. The condition in these 6 flies is quite different from anything hitherto observed, and represents a still further stage in the degeneration process already demonstrated in work on the antelope strain.

In experimental work on direct transmission, discussed as a whole in part ii, three strains of trypanosomes were used, one obtained in 1920 from wild lake-shore *G. palpalis*, the antelope strain isolated in the same year, and the Mwanza human strain. These experiments com-

plete a series of three parallel studies on the effect of continued direct transmission on polymorphic trypanosomes of the *brucei* group. All the strains when first isolated were readily transmissible cyclically by laboratory-bred *G. palpalis*. The history of the three strains since they have been at the laboratory is described.

The results of the transmission experiments, though not necessarily valid for human trypanosomiasis, are of scientific interest. Monkeys cannot be regarded as true natural hosts of the trypanosomes, and propagation by the syringe differs in many respects from any natural method of transmission. Provided that the passage of the monkey strain from animal to animal is always effected by cyclically infected flies, it is a reasonable, though unproven, assumption that the parasite will retain indefinitely its power to infect the salivary glands of the fly. Presumably also any departure from the cyclical method will tend, sooner or later, to alter the constitution of the trypanosome. On biological grounds one would expect that cyclical transmission acting over a prolonged period would lead to a gradual adjustment of the trypanosome to its mammalian host. In nature, this adjustment will be found to exist between a trypanosome and those species of animals upon which it is normally dependent. In certain *G. palpalis* regions there is evidence that a balance has been established between man and a member of the polymorphic group of trypanosomes. However, in most, if not all, human communities where trypanosomiasis occurs man is evidently too susceptible to qualify as an ideal host, and it is difficult to prove the existence of any genuine tolerance in man. Vertebrates in which the trypanosome provokes a rapidly fatal disease cannot be regarded as biologically perfect hosts of the parasite.

T. evansi, *T. equinum* and *T. equiperdum*, so far as is known, rely for their propagation entirely on direct transmission from host to host. It is not known whether posterior-nuclear forms occur in animals infected with surra, but the recovery from game or stock of a virulent trypanosome of the *brucei* group incapable of cyclical development in tsetse-flies would suggest *T. evansi*. It is possible that these three trypanosomes have evolved from fully-equipped tsetse strains of the *brucei* type.

It is conceivable that direct transmission strains, incapable of cyclical development in tsetse, do actually exist in certain human communities, but in game-tsetse areas the case is more difficult to explain. Man is very much more resistant to the trypanosome of the *brucei-gambiense* group than are most of the species of animals upon which the flies feed. Apparently the great majority, if not all, of the cyclically-carried wild fly strains of polymorphic trypanosomes in game-tsetse areas are innocuous to healthy man. Yet in some of these areas a certain number of human beings carry in their blood trypanosomes indistinguishable from the ubiquitous game organism. The behaviour of the parasite in man and the curious distribution of the disease are not adequately explained by the theory that the parasite relies mainly, if not entirely, on cyclical transmission for its passage from man to man. On the other hand, several facts point to the intervention of direct transmission. It is possible that a series of direct passages from man to man may confer on a strain of trypanosomes attributes sufficiently deep-rooted to survive cyclical passage through *Glossina*. In this way more or less stable cyclical human strains might arise in the wake of an epidemic. Direct transmission offers an explanation of the sporadic distribution of the human disease in certain

G. morsitans areas. A patient whose blood is swarming with trypanosomes will afford excellent opportunities for the direct transmission, by the fly, to his immediate neighbours ; should, however, these trypanosomes succeed in establishing themselves cyclically in the fly, they may on the completion of their development be no longer able to survive in human blood. There is a widespread tendency to assume that all human cases derive their infection from cyclically infected wild flies. In pointing out that infection occurs shortly after visiting a fly area for the purpose of hunting, the facts that nearly every man in the area is a hunter and that the patient himself or his friends and relations live in more or less close contact with tsetse are apt to be overlooked. Infection is most likely to occur when one or more of the men entering a fly country are already infected. Until irrefutable evidence is obtained that " clean " natives from a " clean " area where there is no fly and no human trypanosomiasis can contract the disease by entering a fly-area where there are no people, an open mind should at least be maintained as to the relative importance of cyclical and direct transmission in the spread of human trypanosomiasis in game-tsetse areas. At present it may be supposed that under circumstances, not yet understood, the game trypanosome, *T. brucei*, can establish itself in man, using him as an adventitious host and causing a fatal disease, a feature of which is a heavy infestation of the peripheral blood. The parasite thus stands an excellent chance of being transmitted mechanically to fresh human hosts, and of maintaining intact those qualities which originally determined its establishment in man.

Kligler (I. J.) & Weitzman (I.). **Experimental Study of Trypanosomiasis in Palestine.**— *Ann. Trop. Med. & Parasit.*, xviii, no. 4, pp. 437–458. Liverpool, 30th December 1924.

In an outbreak of trypanosomiasis in mules in Northern Palestine, the morphology of the parasite, the clinical aspect of the disease, and the pathological lesions produced, indicate that the strain belonged to the *T. evansi* group. A real immunity or resistance to infection appears to be set up in animals that are cured. Even in normal healthy animals there is a partial resistance to this strain, as indicated by the relapsing nature of the infection.

Carter (H. R.). **Preferential and Compulsory Breeding-places of *Aëdes* (*Stegomyia*) *aegypti* and their Limits.**— *Ann. Trop. Med. & Parasit.*, xviii, no. 4, pp. 493–503. Liverpool, 30th December 1924.

The breeding-places of *Aëdes* (*Stegomyia*) *argenteus*, Poir. (*aegypti*, L.) in America are here discussed under two headings. The preferential breeding-places include those that are chosen for oviposition when an ample choice of varied conditions is available, and consist chiefly of collections of water in artificial containers, wood, cement, stone or brick appearing to be more attractive than metal. Calabashes seem to be especially attractive. When these conditions are lacking, others may be substituted, and these may form the compulsory breeding-places. Thus larvae were found in Panama in a rot-hole in a tree and in small collections of water in the axils of the leaves of ornamental plants of the genus *Colocasia*, when all the preferred breeding-places had been rendered inaccessible. Very few of the larvae found on the ornamental

plants developed into adults, so that the latter are considered of minor sanitary importance. The view that mud at the bottom of a collection of water prevents this mosquito from breeding therein is erroneous, but it is stated that it has not been found breeding in nature in any collection of water all the sides of which at the water's edge were of mud.

The utilisation of breeding-places other than those naturally preferred is of decided importance and makes control more difficult than if only the latter were used. There is a further danger that the adaptability of this species to breeding in what are now abnormal places might be cultivated and developed. It therefore seems advisable to plan methods of control so as to limit as much as possible the use of compulsory breeding-places by the mosquito. Oiling, the use of fish, and the emptying and refilling of water containers at proper intervals will in general sufficiently control the production of the larvae without depriving them of their preferential breeding-places for oviposition. Control of *A. argenteus* therefore (which may also be considered as applying to Anophelines) by measures that allow of oviposition in their preferential breeding-places may be, and in certain places will be, the best method to adopt.

Southwell (T.). **On a Collection of Linguatulids in the Liverpool School of Tropical Medicine.**— *Ann. Trop. Med. & Parasit.*, xviii, no. 4, pp. 515–531, Liverpool, 30th December 1924.

A number of Linguatulids are recorded from different hosts, and an attempt is made to provide a key to all the known genera and species.

Ingram (A.) & Macfie (J. W. S.). **Notes on some African Ceratopogoninae—Species of the Genus** *Forcipomyia*.— *Ann. Trop. Med. & Parasit.*, xviii, no. 4, pp. 533–593, 17 figs. Liverpool, 30th December 1924.

The species on which this work is based were collected in various parts of East and West Africa, chiefly in the Gold Coast. The presence of bands on the legs and colour markings have been found to be too variable to be reliable as specific characters. A key to the African species of *Forcipomyia* is given. *F. castanea*, Wlk., is described at length, including the various stages. The other species dealt with are *F. inornatipennis*, Aust., *F. ingrami*, Cart., and the new species *F. biannulata, F. auripes, F. squamipennis, F. lepidiota, F. venusta, F. pampoikila, F. nigrotibialis, F. hirsuta, F. tigripes, F. aethiopiae, F. exigua, F. ashantii, F. melanchroa* and *F. nigeriensis*.

Wright (W. R.). **On the Hibernation of Adult Mosquitos.**— *Ann. Trop. Med. & Parasit.*, xviii, no. 4, pp. 619–627. Liverpool, 30th December 1924.

These investigations were carried out in 1920–1924 in North Wales with *Anopheles maculipennis, Theobaldia annulata* and *Culex pipiens*, and the conditions under which these mosquitos were found during the winter are described. In reviewing previous literature it is suggested

that the variations occurring in different observations are probably of climatic origin. No signs of either physical or physiological intoxication [*R. A. E.*, B, xi, 162] were noticed, nor was any abnormality of the malpighian tubules discovered. Both under natural and laboratory conditions the eggs matured as early as January. The Anophelines were flying actively within farm buildings throughout the winter and only refused food immediately after a blood meal. Stables and other buildings containing animals appear to attract *Anopheles maculipennis* because of the combination of darkness, warmth and easily accessible food, and it is suggested that the attraction that they thus exert may be in progress of giving rise to a zoophilic race of mosquitos, as has been supposed by various authors.

The collection of hibernating mosquitos by itself is not considered of any value as a means of control.

VAN SACEGHEM (R.). **Effets de l'inoculation de sang contenant des toxines trypanosomiques, dues à** *Trypanosoma congolense pecorum*, **sur les infections du** *Trypanosoma cazalboui* **var.** *vivax*.—*Bull. agric. Congo belge*, xiv, no. 4, pp. 608–609. Brussels, December 1923. [Received 10th January 1925.]

The simultaneous infection of animals with *Trypanosoma congolense-pecorum* and *T. cazalboui* var. *vivax* [*R. A. E.*, B, xi, 88] has been further tested. Defibrinated blood heavily infected with *T. congolense-pecorum*, to which a trace of emetic was added, was inoculated into animals showing infection with *T. cazalboui* var. *vivax*, with the result that the latter disappeared from the circulation owing to toxins produced by the former.

VAN SACEGHEM (R.). **Remarque sur la dispersion géographique de l'***Ornithodorus moubata*.—*Bull. agric. Congo belge*, xiv, no. 4, pp. 612–613. Brussels, December 1923. [Received 10th January 1925.]

The absence of *Ornithodorus moubata* from a volcanic area of the Belgian Congo is discussed. It is thought that the products resulting from the chemical action produced by the contact of the lava with the oxygen of the air are unfavourable to the development of the tick and that it is not in this case a question of humidity [*cf. R. A. E.*, B, x, 44].

Departmental Activities: Entomology.—*Jl. Dept. Agric. Union S. Africa*, x, no. 1, pp. 9–10. Pretoria, January 1925.

Glossina morsitans is recorded from Bechuanaland, where it has been found infesting a large area about 80 miles north of Lake Ngami.

G. pallidipes has been found on farms in the Enkwaleni Valley, Natal, where cases of nagana have recently appeared. Though it is locally believed that the disease has recently spread there, evidence exists of the locality being known as dangerous to cattle as long ago as 1867.

PORTER (A.). **Notes on some Insect Larvae that may occur in Man in South Africa.**—*S. African Jl. Sci.*, xxi, pp. 373–377, 8 figs. Johannesburg, November 1924.

An account is given of the records of Dipterous larvae infesting man in South Africa during the last 6 years, the species concerned being *Wohlfahrtia* (*Sarcophaga*) *magnifica*, infesting wounds and also taken from the ear; *Cordylobia anthropophaga*; *Calliphora croceipalpis*, taken from the ear and also from freshly passed faeces; *Auchmeromyia luteola*; *Stomoxys calcitrans*, which was recorded in a single case from the foot of a stable boy; and *Musca domestica* taken from faeces on several occasions under conditions considered to have absolutely prevented accidental contamination, and once from a neglected sore.

CURSON (H. H.). **On the Causal Organisms of Nagana.**—*S. African Jl. Sci.*, xxi, pp. 432–434, 3 figs. Johannesburg, November 1924.

The object of this note is to draw attention to the frequent misapplication of the term "nagana" in reference to the disease of domesticated animals due to *Trypanosoma brucei*. Examples of this statement occurring in literature from 1912 to 1922 are quoted, and the question is summarised as follows: To apply the term nagana only to the disease caused by *T. brucei* is incorrect, for it has been shown that *T. congolense* and *T. vivax* are also responsible for the symptoms that are described, not only by the Zulus, but also by European settlers, as those of nagana. Nagana is best described as constituting a group of trypanosome diseases each characterised by a somewhat similar train of symptoms.

PEARCE (L.). **Tryparsamide Treatment of African Sleeping Sickness.**—*Science*, lxi, no. 1569, pp. 90–92. Garrison, N.Y., 23rd January 1925.

Of the two ways of dealing with sleeping-sickness in tropical Africa, the destruction of breeding-places of *Glossina* and the cure of persons suffering from the disease, the latter is considered the more feasible. Tryparsamide is the only drug that has shown as yet a marked therapeutic action in the late stages of the disease.

PATTON (W. S.) & SENIOR-WHITE (R.). **The Oriental Species of the Genus *Musca* Linnaeus.**—*Rec. Ind. Mus.*, xxvi, pt. 6, pp. 553–577, 5 pls. Calcutta, November 1924. [Received 21st January 1925.]

This forms the second paper in a series on the oriental Muscids [*R. A. E.*, B, xii, 155] and includes re-descriptions of all the species of *Musca* at present known from that region. The present contribution is not intended as final, a further study of fresh material of some of the rarer species being necessary before systematic work on the family can be completed. The species described include *M. fletcheri*, sp. n., from India; a key is also given to the males of the oriental species of *Musca*.

TONNOIR (A. L.). **Australasian Simuliidae.**—*Bull. Ent. Res.*, xv, pt. 3, pp. 213–255, 13 figs. London, January 1925.

The author's summary of this paper is as follows : In this paper five species of *Simulium* and 16 species of *Austrosimulium* are dealt with. The new genus *Austrosimulium* differs mainly from the former in the number of joints in the antennae, which are 10 instead of 11 ; it seems to be restricted to the Indo-Australian region. In many cases the species of *Austrosimulium* cannot be differentiated from each other in the adult stage, although they are clearly different in their early stages, and especially in the pupal stage. Seven species of *Austrosimulium* occur in New Zealand : *A. vexans*, Mik, *A. ungulatum*, sp. n., *A. australense*, Schin., *A. tillyardi*, sp. n., *A. longicorne*, sp. n., *A. multicorne*, sp. n., and *A. laticorne*, sp. n. Only the first two of these are distinguishable from the others in the adult stage ; the remainder can only be differentiated in the pupal or late larval stages. Five out of these seven New Zealand species are known in their early stages. In Australia (including Tasmania) five species of *Simulium* and nine of *Austrosimulium* are known, viz., *S. aurantiacum*, sp. n., *S. fergusoni*, sp. n., *S. ornatipes*, Skuse, *S. umbratorum*, sp. n., *S. terebrans*, sp. n., *A. crassipes*, sp. n., *A. cornutum*, sp. n., *A. tasmaniense*, sp. n., *A. victoriae*, Roub., *A. furiosum*, Skuse, *A. bancrofti*, Tayl., *A. torrentium*, sp. n., *A. simile*, sp. n., and *A. weindorferi*, sp. n. The two species, *A. victoriae*, Roub., and *A. furiosum*, Skuse, have not been identified with certainty, so that further investigation may show that one or two of the new species are synonymous with them. The early stages of one species of *Simulium* and five of *Austrosimulium* from Australia are described.

Keys are given for distinguishing the adult males, the adult females, the larvae and the pupae.

EDWARDS (F. W.). **Mosquito Notes.—v.**—*Bull. Ent. Res.*, xv, pt. 3, pp. 257–270. London, January 1925.

Since the publication of the author's revision of the mosquitos of the Australian region [*R. A. E.*, B, xii, 113] further species have been found in the Solomon Islands, including *Rachionotomyia distigma*, sp. n., and *Aëdes* (*Finlaya*) *albilabris*, sp. n. A list is also given of six species taken in New Ireland. *Theobaldia tonnoiri*, sp. n., is the first species of this genus to be found in New Zealand. *Uranotaenia xanthomelaena*, sp. n., breeds in pitcher plants in the Federated Malay States. The identity of certain types is discussed after examination of those described by van der Wulp from North America, Java and Sumatra, and others described by Theobald and Enderlein. *Anopheles annularis*, Wulp, may prove to be identical with *A. fuliginosus*, Giles. *A. annulimanus*, Wulp, is synonymous with *A. maculipennis*, Meig., or *A. quadrimaculatus*, Say (probably with the latter).

Other new synonymy, etc., is *Taeniorhynchus* (*Culex*) *crassipes*, Wulp (*brevicellulus*, Theo.) ; *T. perturbans*, Wlk. (*Culex testaceus*, Wulp) ; *Aëdes* (*Culicelsa*) *centropunctatus*, Theo., to which the species previously identified by the author from the Gold Coast as *Aëdes* (*Ochlerotatus*) *sudanensis*, Theo., must be referred ; *Aëdes* (*Grabhamia*) *caballus*, Theo. (*A.* (*Ochlerotatus*) *chelli*, Edw.) ; *Aniella ziemanni*, End., which is extremely close to *Aëdes* (*Stegomyia*) *apicoargenteus*, Theo. ; *Reedomyia sudanensis*, Theo. which is probably identical with the earlier *Aëdes tarsalis*, Newst., the name in any case

being preoccupied by *Culex sudanensis*, Theo.; *Mucidus nigerrimus*, Theo., which is apparently identical with the much earlier *M. mucidus*, Karsch, which the author now considers to be distinct from the West African *M. africanus*, Theo.; *Taeniorhynchus* (*Mansonioides*) *annulipes*, Wlk. (*Culex longipalpis*, Wulp); *Aëdes apicoargenteus*, Theo. (*Kingia alberti*, Theo.); *Aëdes* (*Stegomyia*) *fraseri*, Edw. (*K. maculoabdominalis*, Theo.); *Aëdimorphus argenteopunctatus*, Theo. (*quinquepunctatus*, Theo.); *Taeniorhynchus cristatus*, Theo. (*Chrysoconops nocturnus*, Theo.); *Culex argenteopunctatus*, Ventr. (*Heptaphlebomyia kingi*, Theo.); *Aëdomyia venustipes*, Skuse (*Lepiothauma furfurea*, End.); and *Aëdes* (*Stegomyia*) *apicoargenteus*, Theo. (*Aniella togoensis*, End.).

Aëdes (*Stegomyia*) *subargenteus*, sp. n., and *Mimomyia pallida*, sp. n., are described from Nyasaland, and *Aëdes* (*Aëdimorphus*) *pubescens*, sp. n., from Sierra Leone.

The grouping of the Ethiopian species of *Aëdes* (in the wide sense) is revised, with notes on certain species.

Jobling (B.). **A Contribution to the Biology of** *Ornithodorus moubata*, **Murray.**—*Bull. Ent. Res.*, xv, pt. 3, pp. 271–279, 1 pl., 3 figs. London, January 1925.

These observations, made in the course of breeding of the tick, *Ornithodorus moubata*, Murray, during 1923–24, supplement other work on the same subject [*R. A. E.*, B, x, 25]. The observations previously recorded, that a fertilised female did not oviposit until after it had fed and that females may be fertilised before engorgement, were fully borne out. The greatest number of eggs is laid in the first batches after the first and second meals. In succeeding batches the number diminishes. Moreover, about 96 per cent. of the eggs of the first batch hatch, while only about 14·5 per cent. of the sixth batch do so. The maximum number of eggs laid by one female was 1,217, an average of 84·5 per cent. developing. The female does not immediately abandon the eggs, but may remain with them after the larvae hatch and even until the first-stage nymphs have developed. From 5 to 10 of these may sometimes be seen clinging to the ventral surface of the female, and if set free a female may crawl a long distance without losing a single nymph. This may have a considerable bearing on the dissemination of nymphs of the 1st instar, and further observation on this point is desirable.

Ingram (A.). & Macfie (J. W. S.). **New Ceratopogoninae from Nyasaland (Dipt.).**—*Bull. Ent. Res.*, xv, pt. 3, pp. 283–288, 3 figs. London, January 1925.

The new species described are *Culicoides lamborni*, *C. pycnostictus* and *Dasyhelea nyasae*.

Buxton (P. A.) & Hopkins (G. H. E.). **The Early Stages of Samoan Mosquitos.**—*Bull. Ent. Res.*, xv, pt. 3, pp. 295–301, 8 figs. London, January 1925.

The eggs, larvae and pupae of *Culex annulirostris*, Skuse, *C. fatigans*, Wied., *Aëdes kochi*, Dön., *A. argenteus*, Poir., and *A. variegatus*, Dol., are described, many of these being previously unknown.

Lamborn (W. A.). **An Attempt to control** *Glossina morsitans* **by means of** *Syntomosphyrum glossinae*, **Waterston.**—*Bull. Ent. Res.*, xv, pt. 3, pp. 303–309, 1 map. London, January 1925.

When it was decided to attempt the control of *Glossina morsitans* in Nyasaland by the introduction into a badly infested fly area of some parasite destructive to Muscids in other regions, the Chalcid, *Syntomosphyrum glossinae*, Waterst., which is not only hyperparasitic on *G. morsitans* through Mutillids, but may also attack them directly, was chosen for the purpose, for reasons that are explained. The puparia of *Sarcophaga*, which can be obtained in almost unlimited numbers, were used for rearing the parasites. The area chosen for the experiment was a part of the Livingstonia Peninsula, which is enclosed on two sides by Lake Nyasa, the tracks along which the parasites were liberated being shown on a map. In June 1923 the first liberations were made, and from January to the end of March 1924 collections of *Glossina* pupae were made and examined for parasites, as it was thought that by that time even those last liberated might have produced some appreciable effect. The percentage of puparia parasitised by *S. glossinae* was 0·4 in 1922 and 0·6 in 1923 ; early in 1924 it was 8·7. The data for 1922 and 1923, whether for the first quarter or for the whole year, demonstrate the extreme rarity of *S. glossinae* under the conditions existent before its artificial introduction ; those for 1924, the positive results that attended the experiment to exploit the parasite. Taking into consideration certain initial difficulties and the fact that the parasites were liberated during the dry, hotter months, it is thought that such experimental work, with an even greater output of *S. glossinae* maintained throughout the year, might possibly be worth while. There appears to be no limit to the number of parasites that could be bred in the laboratory, at least during the middle months of the year, even with only native assistance.

Jucci (C.). **L'immunità negli insetti.** [Immunity in Insects.]—*Ann. d' Igiene*, xxxiv, no. 11, pp. 814–832. Rome, November 1924.

This is a review of the work done on the immunity shown by many insects to pathogenic agents. A list of references to the existing literature is given.

Toumanov (K.). **La tuberculose expérimentale chez le Phasmide** *Dixippus morosus*.—*C. R. Soc. Biol.*, xcii, no. 1, pp. 14–15. Paris, 16th January 1925.

The destruction of tubercle bacilli and other acid-resisting micro-organisms in *Galleria mellonella* [*R. A.E.*, B, ii, 53 ; viii, 86] is explained by the presence in the insect (which feeds on wax) of a special ferment (lipase) that digests the waxy capsule of the tubercle bacillus. To avoid this the Phasmid, *Carausius* (*Dixippus*) *morosus*, was chosen for experiment ; the technique employed was the same as that used by Metalnikov in the case of *G. mellonella*.

C. morosus appears to be completely immune even with doses that prove fatal to mammals. The bacilli disappear quickly from the blood. The reaction, however, differs from that of *G. mellonella*, in that no rapid

or complete digestion of the tubercle bacillus occurs inside either the phagocytes or the giant cells. The capsules are less compact and dense and not constantly present. The complete bacilli are isolated and fixed by the phagocytes and giant cells, in which they live without proving noxious to the host.

MERCIER (L.). **Diptères "buveurs de sang" et Diptères "succeurs de sueur." Leur association possible dans la propagation de certaines maladies d'origine microbienne.**—*C. R. Soc. Biol.*, xcii, no. 3, pp. 135–136. Paris, 30th January 1925.

Stomoxys calcitrans, L., *Lyperosia irritans*, L., *Musca autumnalis*, DeG. (*corvina*, F.), *M. vitripennis*, Meig., *Morellia aenescens*, R.-D., *M. simplex*, Lw., and *Hydrotaea irritans*, Fln., are the predominating flies amongst cattle in Normandy. Of these only the first two are true blood-suckers. The other species feed on skin exudations, but readily ingest blood when available as a result of wounds left by the true blood-sucking flies or other causes. In view of the direct relation between blood-sucking flies and those feeding on exudations, the possible importance of the latter as disease carriers should receive more attention.

CIUREA (T.) & DINULESCU (G.). **Ravages caused by the Goloubatz Fly in Roumania: Its Attacks on Animals and Man.**—*Vet. Jl.*, lxxxi, no. 2, pp. 74–81, 4 figs. London, February 1925.

This is a somewhat abridged form of a paper on an outbreak of *Simulium* previously noticed [*R. A. E.*, B, xii, 190].

[BARANOV (N.).] **Баранов (Н.). "Голубачка мушица"** (*Simulium columbaczense* **sensu latiore**).—*Glasnik Minist. Poljoprivrede i Voda*, ii, no. 7, pp. 55–68, 7 figs. Belgrade, November 1924.

This paper is in Serbian, and in his English summary the author states that he gives the results of an investigation of *Simulium* spp. in the region of the lower Danube. Seven different species of *Simulium* have been found, two of which, *S. begbunaricum* and *S. brnizense*, are described as new. Both of these resemble *S. maculatum*, the main difference being in the structure of the hypopygium. The other species found were *S. ornatum*, Mg., *S. reptans*, L., *S. nölleri*, Friederichs, *S. maculatum*, Mg., and *S. angustipes*, Edw.

[BARANOV (N.).] **Баранов (Н.). Нове врсте инсеката пронађене у Србији.** [New Diptera from Serbia.]—**Пољопривредна Огледна Контролна Станица** [*Agric. Expt. Sta.*], Br. 1, 11 pp., 8 figs. Belgrade, 1925.

The new species dealt with are described in Serbian and German; they are the Sarcophagines, *Blaesoxipha krameri* and *Sarcophaga pseudaratrix*, and the Simuliids, *Simulium* (*Nevermannia*) *serbicum*, *S.* (*N.*) *begbunaricum*, and *S.* (*N.*) *brnizense*, the last two having also been described in the preceding paper. A key is given to the 9 species of *Simulium* known from Serbia, including *S. auricoma*, Mg.

Belpel (J.). **De l'Habronémose cutanée des Equidés (Dermite granuleuse, Plaies d'été) dans le Bas-Languedoc.**)—*Rev. vét.*, lxxvii, no. 1, pp. 1–25, 4 figs. Toulouse, January 1925.

An account is given of cutaneous infestation with *Habronema* in horses, with the symptoms, aetiology and treatment of the disease. The part played by flies as transmitting agents of the causal organism is briefly explained.

Carpenter (G. H.). **Warble-flies of Cattle.**—*Mem. & Proc. Manchester Lit. Phil. Soc.*, lxviii, 1923–1924, pp. vii–viii. Manchester, 1924.

The eggs of *Hypoderma bovis*, DeG., and *H. lineatum*, Vill., are laid on the hair of cattle, generally upon the legs, rarely on shoulder or flank, never, apparently, on the back. The larvae hatch in a few days, and bore their way into the skin, whence they migrate to the gullet wall, the submucous coat of which serves as their resting place for some weeks or months in the course of their journey through the host's tissues to their final position in the back.

The number of larval stages is still to be determined. According to Gedoelst [*R. A. E.*, B, x, 111], there are only three altogether, but Laake [*R. A. E.*, B, ix, 171 ; xii, 185] believes not only that the migrating larva is a second instar succeeding the newly-hatched individual that bores into the skin, but that there is an ante-penultimate instar beneath the skin, differing from the migrating larva in the total absence of spines on the body segments. If his view is adopted, five larval stages in the life-history must be recognised.

Marcovitch (S.). **New Insecticide for the Mexican Bean Beetle and other Insects.**—*Tennessee Agric. Expt. Sta.*, Bull. 131, 19 pp., 7 figs. Knoxville, Tenn., October 1924.

Experiments with sodium fluosilicate [*cf. R. A. E.*, A, xiii, 118] show this substance to be more effective against *Lipeurus variabilis* (wing louse) than sodium fluoride and that the fowls treated remain free from lice for a longer period. It has also been found satisfactory against cockroaches.

Howard (L. O.). **Report [1923–24] of the Entomologist.**—*U.S. Dept. Agric.*, 30 pp. Washington, D.C., 1924.

The use of benzol for the destruction of larvae of the screw-worm fly [*Cochliomyia macellaria*] [*R. A. E.*, B, xii, 66] has given very good results and is now being largely used. The repellent mixture [*loc. cit.*] is also giving good results, but it is hoped to find something both more healing to wounds and more lasting in its effects. Chloropicrin in low dilution in mineral oil has recently been tested and is very promising.

Experiments have been made to determine the possibility of controlling the breeding of Anophelines in extensive swamp areas by means of dry insecticides distributed by aeroplanes. Paris green diluted with an inert carrier was used over various types of breeding-places, ranging from comparatively open lakes to heavily overgrown swamp areas. It was found that when the dust was properly distributed a considerable proportion of the larvae could be easily and quickly killed over large areas.

Cram (E. B.). **Demodectic Mange of the Goat in the United States.**—*Jl. Amer. Vet. Med. Assoc.*, lxvi, no. 4, pp. 475–480, 5 figs. Detroit, Mich., January 1925.

This is thought to be the first case of demodectic mange recorded in goats from the United States. The details of the case appear to agree with those given by European authors, whose works are reviewed.

Ewing (H. E.). U.S. Bur. Ent. **New Mites of the Family Dermanyssidae (Acarina).**—*Ent. News*, xxxvi, no. 1, pp. 18–22. Philadelphia, Pa., January 1925.

The species described are *Serpenticola easti*, sp. n., taken from a captive lizard (*Sceloporus graciosus*); *Leiognathus brevipes*, sp. n., from Virginia on a scarlet tanager (*Piranga erythromelas*); *Liponyssus robustipes*, sp. n., from a bat (*Tadarida mexicana*); *L. chilensis*, sp. n., from Chile on a bat (*T. brasiliensis*); and *Dermanyssus oti*, sp. n., from Indiana on an owl (*Otus asio*).

[**The Effect of** *Melinis minutiflora* **on Ticks.**]—*Ann. Rept. Insular Expt. Sta., Rio Piedras, Porto Rico, 1923–24*, pp. 102–103. San Juan, P.R., 30th July 1924. [Received 10th January 1925.]

This report contains an account of an investigation of the effect of molasses grass (*Melinis minutiflora*) on the tick, *Boophilus* (*Margaropus*) *annulatus australis*, Fuller [*R.A.E.*, B, xiii, 2].

Spencer (R. R.) & Parker (R. R.). **Rocky Mountain Spotted Fever: Experimental Studies on Tick Virus.**—*Pub. Health Repts.*, xxxix, no. 48, pp. 3027–3040, 6 charts. Washington, D.C., 28th November 1924.

Further observations and experiments on lines previously described [*R.A.E.*, B, xi, 89] have led to confirmation of earlier observations of previous workers, that ticks of the species *Dermacentor venustus* (*andersoni*), which have received the infection of Rocky Mountain spotted fever in the larval or nymphal stage, retain it in the adult stage.

The following is taken from the authors' summary:—A 24-hour incubation at 37° C. (98·6° F.) of unfed hibernating nymphs and adults infected as larvae and subsequent injection of emulsions of such ticks into guineapigs gave a higher percentage of positive infection than the injection of similar ticks not incubated. Infection of Rocky Mountain spotted fever in adult ticks subjected to winter temperatures (32° F. or below) may be demonstrated by the production of immunity in guineapigs following the injection of tick viscera immediately upon removal from cold temperatures, by a moderate but typical spotted fever following the injection of ticks after 24 hours incubation at 37° C., and by virulent spotted fever following tick feeding or the injection of ticks after feeding. Control adult ticks free from all infection do not produce death or illness in guineapigs by feeding nor by injection of such ticks after feeding. One infected adult tick may contain after feeding from 3,000 to 5,000 minimum infectious doses for a guineapig. Emulsion of infected fed adult ticks treated with 0·5 per cent phenol will protect guineapigs against 1 c.c. of blood virus. Nothing in the behaviour of blood or tissue virus is comparable to the changes observed in tick virus.

[Vinogradov (A. A.) & Yakimov (V. L.).] **Виноградов (А. А.) и Якимов (В. Л.) Попытка зараженія пироплазмозомъ лошади черезъ клещей** (*Dermacentor reticulatus*).—**Извест. Саратовск. О-ва Естествоиспытателей** [*Rept. Saratov Naturalist's Soc.*], pt. 1, pp. 1–2. Saratov, 1924. [Received 6th February 1925.]

Attempts have been made in the Saratov district to infect horses with piroplasms by means of the ticks, *Dermacentor reticulatus*, found on infected hedgehogs in the district. In no case were piroplasms transmitted to the horses, though this does not prove that this tick is not a vector of equine piroplasmosis.

Galli-Valerio (B.). **Parasitologische Untersuchungen und Beiträge zur parasitologischen Technik.** [Parasitological Researches and Technique.]—*Centralbl. Bakt. Paras. Infekt.*, Ite Abt. Orig., xciv, no. 1, pp. 60–64, 1 fig. Jena, 20th January 1925.

Herpetomonas (*Leptomonas*) *davidi* was found in Valais (Switzerland) in *Euphorbia gerardiana* covered with *Stenocephalus agilis*, and forms of it occurred in the intestine of this bug. *Herpetomonas pyrrhocoris* is recorded from *Pyrrhocoris apterus* in Valais. *Demodex folliculorum*, Sim., was taken on a dog at Lausanne. *Pulex sciurorum*, Bch., was taken on *Sciurus vulgaris*, but this flea does not bite man.

Experiments with lice show that *Pediculus capitis* has great difficulty in travelling over smooth surfaces. The resistance of these lice to fasting is not always prolonged by low temperatures, and examples kept at 0° C. and 14°–15° C. [32° F. and 57·2°–59° F.] all died in 7 days. The action of tincture of sabadilla on head-lice depends on the presence of resin. If resin is present, the lice die in 5 minutes, whereas they live for 1¼ hours in a solution free from it.

Belitzer (A.). **Epizootie und Prophylaxis der Piroplasmose der Pferde, hervorgerufen von** *Babesia caballi*. [The Epizootics and Prophylaxis of Equine Piroplasmosis due to *B. caballi*.]—*Centralbl. Bakt. Paras. Infekt.*, Ite. Abt. Orig., xciv, no. 1, pp. 51–56. Jena, 20th January 1925.

In European Russia two forms of equine piroplasmosis occur, one caused by *Babesia caballi* and transmitted by *Dermacentor reticulatus* and the other due to *Nuttallia equi* and transmitted by *Hyalomma aegyptium*. The former infection occurs in Central and South Russia and the latter in the South only. Piroplasmosis of horses has not been recorded from North Russia. Infection with *B. caballi* occurs only in certain villages the pastures of which are on wooded or marshy ground. It is epizootic only in May and early June, though isolated cases occur in September and October. It is not carried by the larvae and nymphs of *D. reticulatus*. In Central Russia the tick passes the winter in the adult stage and attacks horses in April and May, at which time the frosts are not yet over. The larvae and nymphs seem to spend the summer on small rodents or similar animals. In autumn adults appear again, but do not infest large animals to any extent. The author has developed a method of inoculation which results only in a slight illness. Horses that have undergone this treatment should be put out annually to graze in infested pastures in order to acquire re-inoculation by exposure to repeated attacks of the ticks.

Searle (J.). **The Sticktight Flea,** *Echidnophaga gallinacea.*— *Vict. Nat.*, xl, no. 6, p. 119, 1 pl. Melbourne, October 1923.

The sticktight flea, *Echidnophaga gallinacea*, first recorded from India, has spread rapidly through the equatorial belt and overrun the United States. Unlike other fleas, it remains attached to a suitable host for long periods. Though mainly a pest of poultry, it has been found in large numbers on dogs, cats and rabbits.

It has recently appeared in Western Australia, where it is spreading rapidly. Young chickens, when badly infested, die, and older birds get out of condition. The fleas are found throughout the year and thrive best in ill-kept fowl-houses. The eggs are dropped by the females while attached to the host, and fall beneath the roost, the young larvae feeding on the excrement of the parent fleas and on other animal and vegetable refuse.

Newman (L. J.). **Blow-fly Traps.**— *Jl. Dept. Agric. Western Australia*, i, no. 4, pp. 502–503, 2 figs. Perth, December 1924.

The blow-fly trap described and illustrated is made from a kerosene tin. A piece is cut out of the top and replaced by a 7-inch square of strong fly-wire gauzing in the centre of which a hole (4 inches in diameter) is cut and fitted with an inverted funnel, the lower opening of which (at a depth of about 6 inches) should be about the circumference of a lead pencil. The tin is cut all round about 2 inches from the top, which thus forms a lid containing the funnel. The sides of the tin are tapered at the top so that this lid can fit over it, and handles are fitted to either side of the lid and the bottom of the tin. The attachment of a gauze tray inside the trap to prevent the flies reaching the bait is optional. Any meat offal may be used for the bait, and as it will cease to be attractive if allowed to dry, it must be covered with a quart or more of water, and the traps should be placed in a shady position. When the trap requires recharging, some dry litter should be burnt over the mouth to kill all the flies before removing the lid.

Clark (H. C.) & Zetek (J.). **Tick-biting Experiments in Bovine and Cervine Piroplasmosis.**— *Amer. Jl. Trop. Med.*, v, no. 1, pp. 17–25. Baltimore, Md., January 1925.

Mature individuals of *Boophilus* (*Margaropus*) *annulatus australis* and of *Amblyomma cajennense* are both found on cattle and deer in Panama. Experiments with the former are described in this paper. The progeny of ticks taken from a white-tailed deer suffering from an acute attack of piroplasmosis were capable of producing a mild attack of the disease in a half-bred, non-immune calf. In another instance, a mild attack of piroplasmosis was produced in a brocket deer by heavy infestation with the progeny of *B. annulatus australis* taken from cattle at the time these animals were slaughtered in Panama City.

The indications are that cervine and bovine piroplasmosis are identical and that deer are an important reservoir for cattle piroplasmosis. If not, the tick, *B. annulatus australis*, is capable of being a carrier of two types of piroplasm, and the tick uses the deer as well as cattle for its host.

BARBER (M. A.), KOMP (W. H. W.) & HAYNE (T. B.). **The Significance of the Proportion of Sexes found among *Anopheles* in various Resting Places.**—*Public Health Repts.*, xl, no. 3, pp. 105–110. Washington, D.C., 16th January 1925.

This information is summarised by the authors as follows :—Our observations show clearly that the character of a resting place of *Anopheles* is an important factor in determining the proportion of the sexes found in it—the more accessible the source of blood, the larger the percentage of females—and this factor seems to be more important in the case of *A. crucians* than in the case of *A. quadrimaculatus*. Distance from a breeding-place would seem to be a minor factor in our series, even if it operated at all.

It is to be kept in mind that the habits of *Anopheles* may show great variations according to locality ; and it may be that under certain conditions the proportion of sexes would be a more reliable indicator of distance from a breeding-place than it appears to be in our series. In a large proportion of our observations where the distance from a breeding-place is recorded, the breeding was taking place in irrigated rice-fields. It may be that in the case of a more restricted breeding area the proportion of the sexes would show some relationship to distance. Absence of any but blood-providing shelters might also increase the proportion of males in them. In any case, in determining the relation of distance from breeding-place to the proportion of sexes found, the character of the resting place must be taken into consideration ; and in view of the results of our observations it does not seem likely that a correlation of sex proportion and distance from breeding-place will be found sufficiently definite and universal to be a reliable guide to field workers.

CURRY (D. P.). **Some Observations on Mosquito Control in the Canal Zone, with especial Reference to the genus *Anopheles*.**—*Amer. Jl. Trop. Med.*, v, no. 1, pp. 1–16. Baltimore, Md., January 1925.

Of the diseases known to be commonly carried by mosquitos in the Panama Canal Zone, namely, yellow fever, dengue, filariasis and malaria, the last-named is the only one remaining of any importance. The expenditure on anti-mosquito work for the fiscal years 1919–1924 is compared, showing a systematic reduction, and it is believed that the cost can be still further reduced, even with an extension of drainage for the control of the distant-flying *Anopheles albimanus*. There is no possibility of eliminating annoyance from *Aëdes taeniorhynchus* and *Taeniorhynchus* (*Mansonia*) spp., as these are such long-distance flyers.

Of the 11 species of *Aëdes* that occur, only two are usually troublesome, namely, *A.* (*Stegomyia*) *argenteus* (*aegypti*), which breeds only in artificial containers within or near to human habitations and is a persistent biter by day, and *A. taeniorhynchus*, another fierce biter, which flies in from the tidal swamps as far as 40 miles away, but is only troublesome in the early weeks of the rainy season. Of the 39 species of *Culex*, only *C. fatigans* (*quinquefasciatus*) is troublesome to man.

Of the Anophelines present the species of the *albimanus-tarsimaculatus* group are the most important, as they fly farther, more persistently seek entrance to houses to feed on human blood, and have a higher rate of infectibility with *Plasmodium* than any of the others. Although

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their breeding-places are somewhat general, they seem to be practically the only Anophelines that breed to any extent in the shallow, vegetation-covered areas of the lakes and in the brackish, partly tidal swamps of the Atlantic side of the Isthmus. The creation of Gatun and Miraflores lakes has enormously increased the breeding of *A. albimanus*. *A. pseudopunctipennis* is also common and widely distributed, but breeding is almost limited to the smaller streams and ditches and isolated pools where sunlight has free access and algae are plentiful. This species does not fly so far nor commonly invade habitations; a distance of about half a mile from the breeding-places seems to afford safety. *A. argyritarsis* may be experimentally infected with malaria, but is only dangerous in a manner similar to *A. pseudopunctipennis*, and is less frequently seen in the larval stage. *A. punctimaculatus* and *A. apicimaculatus*, which are very similar in appearance and habits, usually breed in sheltered or grassy pools of clear water and do not generally invade houses or fly far. The former proved experimentally resistant to malaria, and both species are probably innocuous. *A. eiseni* is very restricted in its breeding-places; it is said to prefer the small collections of water held between the sheaths and leaves of plants, and is also found in rock pools; nothing is known of its malaria-carrying powers. *A. neiva*, *A. nimba* and *A. hylephilus* are very rare and breed only in the water held by certain plants.

Imms (A. D.). **A General Textbook of Entomology.**—8vo, xii+698 pp., 607 figs. London, Methuen & Co. Ltd., 1925. Price 36*s.* net.

This book, which the author describes as the outcome of a number of years' experience of the need of a treatise that will meet the requirements of the research worker, the advanced student and the teacher, presents the chief facts concerning the structure, physiology, development and classification of the Insecta, and the biology of some of their more important representatives. Much material has been introduced that has not previously appeared in text-books, the object throughout being to present the essentials, and, at the same time, to indicate where fuller information is available by means of bibliographies at the end of each section.

The sections are grouped under three main headings, parts I and II, which are devoted to the anatomy and physiology, and development and metamorphosis of insects in general, and part III, classification, in which the orders are dealt with separately. In the latter part the anatomy and development as exhibited in the various orders, etc., are discussed; and notes are given on the families, illustrated with references to species, particularly those of economic significance, with short accounts of their habits. Keys to the families are included.

Lécaillon (—) & Audigé (—). **Sur les propriétés insecticides du Toluène.**—*Ann. Epiphyties*, viii (1921), pp. 19–25. Paris, 1922. [Received 14th February 1925.]

In the course of investigations into the insecticidal properties of toluene, it was found that a wooden bed could be cleared of bugs [*Cimex lectularius*] by washing over the wooden parts and also the crevices of the floor with the liquid. Men infested with *Pediculus* were freed from the parasites by one or two applications of the liquid and by soaking the folds of clothing in it, in less time than with any

other insecticide; a slight erythema was produced but quickly disappeared. On a dog, applications produced temporary hyperaemia of the skin and loss of hair on the treated parts; fleas were immediately killed.

EDWARDS (F. W.). **Notes on some European Species of** *Simulium* **(Diptera).**—*Ent. Tidskr.*, xlv, no. 1, pp. 29–34. Stockholm, 1924.

The following are among the species discussed :—

Simulium erythrocephalum, DeG. (*argyreatum*, Lundstr., Edw., nec Mg.); *S. pubiventris*, Zett., which is not a synonym of *S. equinum*, L. (*lineatum*, Mg.); *S. aureum*, Fries (*bracteatum*, Coq., *angustipes*, Edw. nec Friedr.); *S.* (*Culex*) *lanio*, L., the original description of which points to its being a Simuliid; *S. pusillum*, Fries (*minutissima*, Zett., *pygmaea*, Zett.), which is of special interest, because although it is evidently related to *S. latipes*, it differs markedly in the structure of the female claws, and therefore quite invalidates Enderlein's tribe NEVERMANNIINI; and *S. rufipes*, Mg. (*fulvipes*, Edw.). The pupae of *S. pallipes*, Fries, taken from stones in the rapids of a waterfall, were completely enclosed in a boat-shaped cocoon similar to that of *S. equinum*, L., and *S. auricoma*, Mg., from which, however, the pupa differs in structure. *S. lyra*, Lundstr., evidently breeds in rivers. The female has not previously been identified and is briefly described here. *S. hirtipes*, Fries, is common in the mountainous regions of northern Europe, but the only description of its early stages is that of Malloch, which is based on North American material, and now proves inapplicable to the European species, so that the American form must be specifically distinct unless Malloch was mistaken in his association of the early stages. The American pupae have 40–50 branches in the respiratory tufts, while those found by the author in Norway on stones at the edges of a river had only 16.

ENDERLEIN (G.). **Die Simuliiden Bulgariens und ihre Schäden im Jahre 1923.** [The Simuliids of Bulgaria & their Ravages in 1923.]—*Zool. Anz.*, lxi, no. 11–12, pp. 280–288. Leipzig, 28th December 1924.

In 1923 Bulgaria, Rumania and Serbia suffered tremendous loss in cattle, donkeys, horses, sheep, goats and pigs from Simuliids, and it is remarkable that male animals were attacked in far greater numbers than females. The flies appear practically every year, immediately warm weather sets in. *Simulium* (*Friesia*) *strigatum*, Enderl., which occurs at elevations of 3,000-7,000 feet in South Bulgaria, causes death within half an hour to four days, according to the severity of attack.

Simuliids do not cause death in man, but they may give rise to an illness lasting two days. A list of the Simuliids of Bulgaria is given, including *Simulium* (*Odagmia*) *simoffi*, sp. n., *S.* (*O.*) *konsuloffi*, sp. n., *S.* (*Wilhelmia*) *balcanicum*, sp. n., and *S.* (*Friesia*) *tristrigatum* var. *obscurum*, n.

SURCOUF (J.) & FISCHER (E.). **Notes sur la vie larvaire et nymphale du** *Tabanus bromius*, **L.**—*Bull. Soc. ent. France*, 1924, no. 20, pp. 232–237, 7 figs. Paris, 1924.

The larval and pupal life of *Tabanus bromius*, L., is passed in the soil. The pupal stage lasts about three weeks. The larva can bite and suck blood and is capable of biting man. The buccal armature

of the larva is so adapted that it can pierce its prey and penetrate into the tissues. A detailed description of it is given. The method of progress of the larva is described; it can crawl forwards or backwards. The pupa cannot move so freely as the larva.

NATVIG (L. R.). **Fakultativ parasitisme av *Eristalis*-larver hos en ko.** [Infestation of a Cow by the Larvae of *Eristalis*.]—*Norsk Vet.-Tidsskr.*, Oslo, 1924. Separate 11 pp., 1 fig. (With an English Summary.)

A fatal case of myiasis in the digestive tract of a cow due to the larvae of a Syrphid fly, *Eristalis* sp., is described [*cf. R.A.E.*, B, vii, 74].

SAMBON (L. W.). **Researches on the Epidemiology of Cancer made in Iceland and Italy (July-October 1924).**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 3, pp. 39–71, 33 figs. London, 2nd February 1925.

The author briefly reviews data collected in Iceland and Italy concerning the local occurrences of cancer [*cf. R.A.E.*, B, xii, 128]. These facts all point to the importance of parasitic worms in relation to the disease, in which connection *Muspicea borreli*, gen. et sp. n., is described from Strasbourg taken in the subcutaneous connective tissue of the inguinal glands of a mouse. The restriction of cancer to definite streets, even houses, is again demonstrated. In all such cases the intermediate hosts (cockroaches, etc.) of the parasitic worms were present. The predominant species in Iceland is *Blattella germanica*, L. It is believed that these observations in certain districts of Iceland and Italy prove the usefulness of intensive scientific research in limited areas of different countries where the disease is most prevalent and indicates the uselessness of statistics, such as are compiled in central official bureaux by mixing and blending data of very different importance and value, gathered from innumerable localities and losing precious facts in the resulting confusion. Whatever the rôle of parasitic worms, the actual essential cause of cancer is some ubiquitous micro-organism, probably a filter-passer, as the researches of Rous and his fellow workers seem to indicate, but this parasite, apparently, is unable to thrive except in tissues of lowered resistance.

BLAIR (K. G.). **Some Notes on the Insect Intermediate Hosts of *Gongylonema*.**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 3, pp. 76–81, 7 figs. London, 2nd February 1925.

In view of the extremely probable connection between *Gongylonema* and certain forms of cancer, the elimination of these parasites would at any rate control to a very appreciable extent the incidence of these forms of the disease. Actual records of the association of *Gongylonema* with insects indicate that the intervention of an insect host at some period of its life-history is essential to the proper development of the worm. Encysted larvae have been found within the body cavity of many genera of coprophagous beetles and under experimental conditions also in the meal-worms, *Tenebrio molitor*, L., and *T. obscurus*, F., and other Tenebrionid larvae, as well as in the musculature of the cockroaches, *Blattella germanica*, L., *Blatta orientalis*, L., and *Periplaneta americana*, L. A brief review is given of these insect hosts and their habits. Some of the species dealt with have already been noticed in this connection [*R.A.E.*, B, xii, 128]. Among Tenebrionids the cellar beetles, *Blaps mucronata*, Latr., and *B. lethifera*, Marsh., are fairly

common in England. A key is given for the separation of these and the two other species of this genus previously mentioned [*loc. cit.*]. The genus is widely distributed in the southern Palaearctic region, being most numerous in south-west Asia and reaching eastwards to Japan. The original food of the larvae and adults of Tenebrionids was probably decaying vegetable matter. Certain genera have become of economic importance by developing the habit of eating off the seedlings of growing crops, while others have become dung feeders, many species even invading houses, granaries and bakehouses.

The known beetle hosts of *Gongylonema* fall into two categories, dung feeders and meal feeders. The young stages of the Nematodes presumably occur in these hosts, the latter having ingested the egg that has been passed out of the alimentary tract of the mammalian host of the mature worm. In the case of dung feeders this ingestion of the egg may occur in the larval or adult stage, though the development of the worm may perhaps be influenced by the age of the host at the time of ingestion. In the insect host the larvae burrow through the wall of the gut and become encysted in the body cavity or musculature of the insect, this location probably varying according to the species of *Gongylonema*. To complete development the transference to a vertebrate host is essential.

In small mammals, domestic fowls, sheep, cattle, etc., the worm presumably is ingested with the entire insect host or part of it containing the encysted worm. In the new host the cyst wall dissolves and the worm is liberated. Infection in man is difficult to account for except by the fact that some of the smaller insect hosts have been found in food, and in the case of hasty or insufficient cooking the worms might not be destroyed. Meal-worms in flour bins probably obtain the infection from the desiccated excreta of rats, mice or fowls. After encysting, it may (or may not) be immaterial to the *Gongylonema* whether the mealworm be eaten by another rat, or, after surviving an attempt at cooking, be eaten by man. Possibly the investigation of other meal-feeding larvae, *e.g.*, the beetles mentioned above, as well as Lepidopterous larvae of the genera *Ephestia*, *Pyralis* and *Aglossa*, for larval Nematodes would yield results of value.

The possible insect hosts of *Gongylonema* in Iceland besides the cockroaches already mentioned are *Aphodius lapponum*, Gyll., *Blaps mucronata* and *B. gages*, L. *Tenebrio* may possibly occur in bakehouses.

Pristonychus terricola, Hbst., is recorded for the first time from Iceland. A closely allied species preys on *Blaps*. The fate of *Gongylonema*, provided it were swallowed without injury by one of these Carabids, is uncertain. It may have lost its original capacity for burrowing through the wall of the intestine, or possibly perish in the process of digestion. Seurat, however, has shown that the larvae of certain Spirurids, if ingested, along with their first host, by some small animal which is not their appropriate final host, are capable of re-encystment.

Kudo (R.). **Studies in Microsporidia parasitic in Mosquitos. III. On *Thelohania legeri* Hesse (= *Th. illinoisensis* Kudo).**—*Arch. Protistenk.*, xlix, no. 2, pp. 147–162, 1 pl., 1 fig. Jena, 5th November 1924.

Further studies [*R.A.E.*, B, x, 82, 107] with more material show *Thelohania illinoisensis*, Kudo, to be identical with *T. legeri*, Hesse, which seems to be an exclusive parasite of Anopheline mosquito larvae.

Kudo (R.). **Studies on Microsporidia parasitic in Mosquitos. V. Further Observations upon** *Stempellia* (*Thelohania*) *magna* **Kudo, parasitic in** *Culex pipiens* **and** *C. territans*.—*Biol. Bull. Mar. Biol. Lab.*, xlviii, no. 2, pp. 112–127, 5 figs. Woods Hole, Mass., February 1925.

Infection experiments show that the larvae of *Culex pipiens* and of *C. territans* become infected with *Stempellia magna*, Kudo, by feeding upon infected larval tissue. The emergence of the sporoplasm of the spore taken into the gut lumen of a new host takes place in the posterior part of the mid-gut from 6 to 40 hours after feeding on the infected material. The schizonts are first noticed in the adipose tissue of the mid-gut and of adjacent tracheae. Sporogony had not started in the larvae examined four days after feeding on the infected material.

Cowdry (E. V.). **The Occurrence of** *Rickettsia*-**like Microörganisms in adult "Locusts"** (*Tibicen septendecim* **Linn.).**—*Biol. Bull. Mar. Biol. Lab.*, xlviii, no. 1, pp. 15–18, 1 pl. Woods Hole, Mass., January 1925.

Of numbers of the cicada, *Tibicen septendecim*, L., collected in Massachusetts, rather more than 20 per cent. were found to be heavily infected with micro-organisms resembling *Rickettsia*. They were seldom observed within cells, and were restricted in distribution to the lumina of the tract and malpighian system. Apparently they had no pathogenic effect on their host. The alimentary tract, though well developed, was never distended with food, but contained a small amount of coagulum which might well have been produced by the action of enzymes and fixatives upon plant juices. If, however, it is true that this insect seldom if ever feeds in the adult stage [*R.A.E.*, A, xii, 151], this narrows down a search for the point of entry of the parasites.

Grassi (B.). **A proposito delle zanzare androfile e androfobe di Legendre.** [On the anthropophilous and anthropophobe Mosquitos of Legendre.]—*Atti R. Accad. naz. Lincei*, Ser. 6, Rend. Classe Sci. fis. mat. & nat., i, no. 1, pp. 3–5. Rome, 4th January 1925.

The author criticises the views advanced by Legendre on the possible substitution of man-avoiding mosquitos for man-attacking species [*R.A.E.*, B, xiii, 26].

La Face (L.). **Osservazioni sulla nutrizione del** *C. pipiens*. [Observations on the Feeding of *C. pipiens*.]—*Atti R. Accad. naz. Lincei*, Ser. 6, Rend. Classe Sci. fis. mat. & nat., i, no. 1, pp. 51–55. Rome, 4th January 1925.

Observations made by various workers on the blood-sucking habits of *Culex pipiens* have given divergent results and have led to the assumption that there may be different biological races behaving differently in the matter of feeding on blood.

Following on Grassi's work [*R.A.E.*, B, xii, 52] the author began experiments in 1924, using specimens of *C. pipiens* from the same localities. The conclusions reached are that in *C. pipiens* in a given locality the tendency to bite varies at different seasons, being less marked in spring than later in the year. This makes it difficult to

determine if there predominates in a given locality a race of *C. pipiens* much or little adapted to bite man, and the question is one involving much study.

THOMSON (J. G.). **Researches on Blackwater Fever in Southern Rhodesia.**—*London School Trop. Med.*, Res. Mem. Ser., vi, 149 pp., 12 charts, 10 pls., 1 fig., 1 map. London, 1924.

From an examination of the literature on blackwater fever and his own observations in Rhodesia the author has come to the conclusion that the disease is due to repeated attacks by *Plasmodium praecox* (*falciparum*). There is no evidence that any other specific organisms are the cause of this condition, but these may act as exciting factors of the actual onset. Quinine is the most valuable drug in its prevention, but unfortunately is seldom used properly, and so has fallen into disrepute. As the hygienic measures necessary for the prevention of malaria are known, there is no reason why blackwater fever should not be stamped out of those areas in which it is endemic.

The Anophelines that have been found in S. Rhodesia, which are recorded in an appendix, are :—*Anopheles costalis*, *A. funestus*, *A. mauritianus*, *A. maculipalpis*, *A. rhodesiensis*, and *A. squamosus*. The most important and numerous is *A. costalis*, which is apparently the chief carrier. In the houses in rural districts where blackwater fever and malaria occurred this was the only species caught. It is found breeding in brick holes, in pools of water, and in the margin of slowly-flowing streams. There can be no doubt that a careful study of this mosquito would be of great value in the control of malaria and blackwater fever. The majority of the larvæ were found in open exposed pools with little or no shade. The hydrographic and meteorological conditions are favourable for the breeding of Anophelines and the development in them of *Plasmodium*.

RIGOLLET (L.). **Note sur l'organisation de la prophylaxie paludique en Afrique occidentale française.**—*Bull. Soc. Path. exot.*, xviii, no. 1, pp. 32–36. Paris, 1925.

The anti-malarial measures adopted in French West Africa in general are briefly discussed. These consist of the destruction of mosquito larvae and the protection of man by quinine and the usual mechanical means. The enormous expenditure involved in effective quinine prophylaxis indicates the importance of mosquito control in anti-malarial campaigns.

COUVY (A.). **Note sur un essai de prophylaxie antipaludique à Madagascar.**—*Bull. Soc. Path. exot.*, xviii, no. 1, pp. 36–40, 1 map. Paris, 1925.

In certain districts of Madagascar, known to be very unhealthy, the high death rate is directly traceable to the prevalence of malaria. As a result of treating mosquito breeding areas by drainage, etc., and the administration of quinine, the number of deaths in March–June dropped to 769 in 1924 as against 1,192 in 1923.

Marchoux (E.). **La prophylaxie pratique du paludisme.**—*Bull. Soc. Path. exot.*, xviii, no. 1, pp. 40–44. Paris, 1925.

In this note, which contains the conclusions of a treatise on malaria in the press, various anti-malarial measures are briefly reviewed, their advantages and disadvantages being discussed. The treatment of malaria carriers and general sanitation and improvement of living conditions are considered the more important measures to be adopted.

Yakimoff (W. L.), Wassilewsky (W. Z.) & Zawialoff (B.). **La piroplasmose des bovidés dans le gouvernement de Pétrograde en 1923. (Note préliminaire.)**—*Bull. Soc. Path. exot.*, xviii, no. 1, pp. 48–49. Paris, 1925.

Piroplasma (*Babesiella*) *bovis* is considered to be the organism responsible for piroplasmosis of cattle in north-western Russia, and not *Piroplasma bigeminum* as supposed by previous authors [*cf. R.A.E.*, B, xii, 141]. The latter, however, occurs in South Russia (Caucasus, Crimea and Turkestan).

Yakimoff (W. L.), Marcoff (E. N.), Oulassewitsch (J. S.) & Rastegaieff (E. F.). **Sur la répartition géographique du *Trypanosoma theileri* en Russie.**—*Bull. Soc. Path. exot.*, xviii, no. 1, p. 57. Paris, 1925.

In Russia *Trypanosoma theileri* is recorded from cattle as far north as the government of Petrograd.

Chapcheff (C.) [Shapsheva (K. N.)]. **Les détails de la transmission de la fièvre récurrente européenne par les poux.**—*Bull. Soc. Path. exot.*, xviii, no. 1, pp. 97–105. Paris, 1925.

The bulk of this information on the transmission of recurrent fever by lice (*Pediculus*) has been noticed from another source [*R.A.E.*, B, xii, 171].

Report of the Proceedings of the Fifth Pan-African Veterinary Conference held at Nairobi from 6th to 14th April, 1923.—Fol., 130 pp. Nairobi, 1924.

The greater part of this report is devoted to discussions on the diseases of animals occurring throughout Africa, and their control.

The discussion on and resolutions passed about the Arthropod-borne diseases, African Coast fever and trypanosomiasis, have already been noticed [*R.A.E.*, B, xi, 129, 134].

Griffiths (J. A.). **Veterinary.**—*Nyasaland: Ann. Rept. Dept. Agric. 1923*, pp. 13–17. Zomba, 1924. [Received 16th February 1925.]

A great portion of Nyasaland is uninhabited, this being largely due to the presence of tsetse-fly [*Glossina*] and the consequent inability of natives, who depend a great deal on live-stock, to maintain any animals. Trypanosomiasis is, therefore, a greater hindrance to development of the country as a whole than any other disease, and this state of affairs can only be overcome by the agricultural development of the fly-infested areas. The clearing of indigenous forest, scrub and

bush as civilisation extends will drive back the fly in time, and at present offers the only remedy available. The danger of the dissemination of the fly by motor transport is pointed out.

CHURCH (A. G.). **The Tsetse-fly Menace in Tropical Africa.**—*Nature*, cxv, no. 2883, pp. 160–161. London, 31st January 1925.

From reports supplied to the East African Parliamentary Commission by the scientific staffs of five East African territories it appears that the fly-belts are continuous from the British Sudan to Southern Rhodesia. The work of the past and present in connection with the eradication of *Glossina* is briefly reviewed, and the immediate need and importance of such work is pointed out.

SWYNNERTON (C. F. M.). **The Control of the Tsetse-fly Menace.**—*Nature*, cxv, no. 2888, pp. 338–339. London, 7th March 1925.

A scheme for the control of *Glossina* previously suggested by the author [*R.A.E.*, B, xi, 52] has now been put into operation in Tanganyika territory and is here briefly described.

IWANOW (E.). **Le sort du** *Trypanosoma equiperdum* **dans la cavité générale de** *Galleria mellonella*.—*C.R. Soc. Biol.*, xcii, no. 5, pp. 345–347. Paris, 13th February 1925.

The survival of *Trypanosoma equiperdum* in the larvae of *Galleria mellonella* as observed in the experiments described suggests the possible use of these insects as laboratory animals for the conservation of trypanosomes in place of mice or guineapigs. The fact that they are easily transported is a further advantage.

LLOYD (Ll.) & JOHNSON (W. B.). **Notes for Demonstration of Properties illustrating the Diagnostic Characters of the Flagellate Parasites of Tsetse-flies.**—*Trans. R. Soc. Trop. Med. & Hyg.*, xviii (1924), no. 5–6, pp. 243–246, 4 figs. London, February 1925.

The estimation of flagellate infection in tsetse-flies may be done in several ways—by feeding large numbers of flies, in batches, on susceptible animals, and so arriving at a rough figure by means of the infections produced; by dissecting the flies, recording the position of the flagellates, and referring them to their groups by inference from their position without reference to their morphology; or by dissecting the flies, recording the position of the flagellates, and referring them to their groups by their morphology [*cf. R.A.E.*, B, xii, 85]. The first method is cumbersome and unsound from the statistical point of view, though it affords information not given by the other methods. The second is unscientific, as it precludes the discovery of unknown forms, and does not provide for the very numerous double infections; even triple infections may occur. The third method has been practised by the authors in Nigeria, and is statistically the soundest; it does not, however, in all cases serve to distinguish the species within the groups, but this objection is partly overcome by a preliminary study of the infections by the first method of estimation, which shows that species occur in the area under investigation. In Nigeria *Trypanosoma simiae* and *T. uniforme* were found to be absent by feeding experiments.

As considerable use has been made of previous work, there is not much that is actually new in this summary of diagnostic characters,

but no previous workers seem to have sketched the features that serve for identification of the developmental forms in the exogenous cycles, and several have been obviously lost among the infections of the gut in wild flies, and these are at first confusing.

Though there are at the most only 6 or 7 pathogenic tsetse-borne trypanosomes, there is a good deal of synonymy. They fall into three definite groups, distinguished by their morphology in the mammal and their site of multiplication and their morphology in the fly. (1) The *brucei-gambiense* group is polymorphic in the mammal and mainly free-flagellated; in the fly there are two multiplication phases, the trypanosome phase in the mid-gut and a crithidial phase in the salivary glands; practically all forms are free-flagellated; infective forms accumulate in the salivary glands. This group includes *T. gambiense* (*nigeriense*), *T. brucei* (*pecaudi*) and *T. rhodesiense*, the last two being probably identical. (2) The *congolense* group is monomorphic, aflagellated and ribbon-shaped in the mammal; it has two multiplication phases in the fly, the trypanosome phase in the mid-gut and a crithidial phase in the labial cavity; all forms are aflagellated except that which migrates from the gut to the proboscis *via* the proventriculus, and the preinfective form, which invades the hypopharynx; the infective forms accumulate in the hypopharynx. This group includes *T. congolense* (*pecorum*, *dimorphon*, and probably *montgomeryi*) and *T. simiae* (*ignotum*). The last, according to Bruce, may be distinguished in the fly by its larger size. (3) The *vivax* group is monomorphic, free-flagellated, and fusiform in the mammal; it has only one multiplication phase in the fly, a crithidial phase in the labial cavity; all forms are free-flagellated; infective forms accumulate in the hypopharynx. This group includes *T. vivax* (probably *caprae*) and *T. uniforme*, a smaller species and homologue of *T. vivax* in Uganda. Broadly speaking, the morphological features that serve to distinguish the groups in the mammal serve also to distinguish them in the fly, whether in the trypanosome or crithidial phase, with the exception already noted (migrating forms in *T. congolense* group).

There are also two groups of non-pathogenic flagellates, which infest the tsetse; the *T. grayi* group, derived from reptiles and infesting the gut of the fly only, this being in most cases a derivative of *T. kochi* of the crocodile, but may also be a form of *T. varani*; and the herpetomonad group of unknown origin infesting both gut and labial cavity.

The life-history of these groups in the fly is shown in a series of diagrams, but for the purpose of diagnosis the forms that the slides illustrate under the various locations in the fly are contrasted.

BEVAN (Ll. E. W.). **East Coast Fever—The Theory of Latency.**—*Trans. R. Soc. Trop. Med. & Hyg.*, xviii (1924), no. 5–6, pp. 328–335. London, February 1925.

Recrudescence of African coast fever of cattle is attributed by some to infection derived from an animal that, having recovered from a previous attack, has retained the parasite in a dormant form, though it is not known how the parasite can be thus retained. Some consider that the infection may be carried on through the calves. Others, on the other hand, basing their opinion on the observations and deductions of Gonder, consider that in animals that recover the parasite perishes and a complete sterile immunity is established, and consequently that there can be no relapse and no possibility of infecting new ticks. Some of Gonder's observations on the life-cycle of the causal organism,

Theileria parva, are quoted. The reproduction of such organisms is by fission, but sexual reproduction, which only occurs in the tick, appears eventually to be necessary to restore vitality. It is a fact that no parasites are to be discovered in so-called salted cattle (those immune from African coast fever). It is impossible to transmit the disease by means of blood, a circumstance that contra-indicates a further development of the parasites in the blood. Gonder's argument is that because the recovered animal is not subject to a relapse the parasite must perish; it therefore cannot undergo parthenogenesis, and because this does not occur, the animal is completely protected against relapse. The failure to detect the parasite in a recovered animal does not, however, prove that it has died out. It may be present in some unrecognised form that may remain latent until such time as the influence that restrains it is relaxed. It is well known that certain animals show an irregularity of temperature for a few days and then apparently recover. This may be due either to recurrence of a latent infection, or to reinfection, in which case the theory that recovery results in immunity falls to the ground. At the present time the controversy is acute, for if the salted animal can remain a source of danger, the methods of controlling the disease will have to be modified.

FERGUSON (E. W.). **Australian Ticks.**—*Rept. Dir.-Gen. Public Health N.S.W. 1923*, pp. 147–157. Sydney, 1924. [Received 24th February 1925.]

This is a brief review of Australian ticks, including all the described species as well as those of known noxious habits, with details of their classification. A list of species with their hosts and a bibliography are appended. Among those dealt with are *Argas persicus*, the vector of the causal organism of fowl spirochaetosis; *Ornithodorus talaje*, which frequents native houses, attacking man; *Ixodes holocyclus*, which is recorded from marsupials, rodents, dogs, man and birds; *Haemaphysalis leachi* and *H. bispinosa* on cattle and horses; *H. papuana* and *H. longicornis* on cattle; *Rhipicephalus sanguineus*, the vector of canine piroplasmosis; *Boophilus annulatus australis* on cattle, and the vector of *Piroplasma bovis*; *Hyalomma aegyptium* on dogs; and *Amblyomma triguttatum* on the platypus (*Ornithorrhynchus*), kangaroo, horses and cattle.

I. holocyclus passes its three stages on different hosts, the tick dropping to the ground after each stage. The chief interest in this species lies in the toxic effects it produces in man and dogs. In dogs the principal symptom is an ascending paralysis, while in man the symptoms are less definite in their course. In human cases, as in dogs, it is probable that the tick must be present on the patient for two or three days or even longer before toxic symptoms appear. There is no evidence that these symptoms are caused by the larvae, nymphs or adult males. It has not yet been proved that dogs in a tick-infested locality become immune from the bites of ticks. *H. leachi* requires three hosts on which to feed in all stages. The larva and the nymph remain attached for 3–7 days, and the adult female for 6–18 days. The male may remain on the host for many weeks. *H. bispinosa* is a three-host tick, and the winter is passed as a nymph hidden at the base of rushes and clumps of rough grass. *B. annulatus australis* is found in all stages on one host, the replete female dropping off to lay eggs, which average in number about 3,000. Apart from conveying infection these ticks may cause deterioration and even death in cattle by their mere number.

Bedford (G. A. H.). **The Spinose Ear-tick** (*Ornithodorus megnini*, **Dugès**).—*Jl. Dept. Agric. Union S. Africa*, x, no. 2, pp. 147–153, 2 figs. Pretoria, February 1925.

Ornithodorus megnini has been recorded from the ears of cattle, sheep and goats; less frequently in the ears of horses, donkeys, dogs, cats and ostriches; occasionally even on man. The bionomics and control of this tick in South Africa and elsewhere have already been noticed [*R.A.E.*, B, i, 139; vi, 32; vii, 193; ix, 8].

Larrousse (F.). **Nouvelle espèce tunisienne du genre** *Haemaphysalis : H. nicollei* **n. sp.**—*Arch. Inst. Pasteur Tunis*, xiv, no. 1, pp. 97–100, 2 figs. Tunis, 1925.

Haemaphysalis nicollei, sp. n., is described from Tunis, taken from under stones.

Larrousse (F.). **Larve de Linguatilidae parasite de** *Bufo mauritanicus*. —*Arch. Inst. Pasteur Tunis*, xiv, no. 1, pp. 101–104, 2 figs. Tunis, 1925.

A description is given of the larvae of a Linguatulid, probably *Railletiella mediterranea* or *R. spiralis*, taken from *Bufo mauritanicus* in Tunis. The author believes that this is the first record of a Linguatulid from Batrachia.

Megaw (J. W. D.), Shettle (F. B.) & Roy (D. N.). **Typhus-like Fever, probably Tick-Typhus, in Central India.**—*Indian Med. Gaz.*, lx, no. 2, pp. 53–58, 5 pls., 3 charts. Calcutta, February 1925.

Details are given of a number of cases from Central India provisionally diagnosed as tick-typhus, though the actual vector has not been found. The reservoir of the disease is most probably a wild animal. Persons camping or marching in the jungle or open country of certain parts of India are most likely to be affected.

Megaw (J. W. D.). **Indian Tick-Typhus.**—*Indian Med. Gaz.*, lx, no. 2, pp. 58–61. Calcutta, February 1925.

The vector of the disease discussed in the preceding paper is probably *Rhipicephalus sanguineus*, though the evidence incriminating this tick is circumstantial and inconclusive. The only other possible vector is a mite, but the usual symptoms following the bites of mites infective with similar diseases are entirely absent. The disease closely resembles Rocky Mountain spotted fever.

Cases have so far been recorded from the Kumaon Hills at a height of 4,500 to 6,000 ft. in the hot season, and from the Central India plateau and the Orissa forests at heights of 1,500 to 2,000 ft. in the cold season. It is possible that cases among children escape notice in the endemic areas and that the majority of adults in these areas are immune, so that the disease is chiefly seen in newcomers from uninfected places. If ticks are removed within an hour or two of attachment, infection is not likely to occur.

A brief summary of the clinical features of the disease is given.

Sinclair (C. G.). **Mild Typhus (Brill's Disease) in the Lower Rio Grande Valley.**—*Public Health Repts.*, xl, no. 6, pp. 241–248, 1 map. Washington, D.C., 6th February 1925.

An outbreak of what appeared to be mild typhus fever in the lowlands along the Rio Grande Valley occurred during the summer of 1924. Evidence was obtained to indicate that indigenous cases of similar type are not uncommon in this valley. The clinical aspects and laboratory findings are discussed. It seemed logical to assume that the disease had been imported from the endemic areas of Mexico, but enquiry of the nearest Mexican town failed to reveal the presence of the disease there. As *Pediculus humanus* (*corporis*) is commonly accepted as the vector of typhus, search was made for it without success. This louse does not often occur among the Mexicans of the lower Rio Grande Valley, and it is common knowledge in the lowlands that, if imported, it does not survive more than a few days, at least during the summer months. *P. capitis*, however, is ubiquitous. No observations were made upon ticks, fleas or bedbugs. *Aëdes argenteus* (*aegypti*) was present only in small numbers. Epidemiological evidence is thus brought to support the experimental work of others, which has tended to show that *P. capitis* may be similarly concerned in the transmission of the disease, and further emphasises the view, with which the author agrees, that *P. capitis* is merely a race of *P. humanus*.

Kobayashi (H.). **On the Animal Parasites in Korea.**—*Japan Med. World*, v, no. 1, pp. 9–16. Tokyo, 15th January 1925.

This report chiefly deals with parasitic worms. Malaria prevails all over the peninsula, but the tertian form is the only one that has been definitely identified. The most common Anopheline was *Anopheles hyrcanus* (*sinensis*), the larvae of which were discovered abundantly in pools and rice-fields. *A. coreicus* was found in one locality. Both filariasis and elephantiasis are said to be present in the southern part of Korea and are probably due to *Filaria bancrofti*. Two possible cases of intestinal myiasis have been reported caused by *Muscina stabulans*. Mites, particularly Tyroglyphids, are often found in human faeces. An instance is recorded in which eggs of *Tyroglyphus* sp. were found in the faeces of a patient suffering from Banti's disease and in those of several persons in his family. Some of these eggs contained a fully developed embryo. This may be an instance of a temporary parasitic habit of the mite. The tick, *Argas persicus*, is recorded as having attacked man.

Ewing (H. E.). U.S. Bur. Ent. **New Parasitic Mites of the Genus *Laelaps*.**—*Proc. Ent. Soc. Wash.*, xxvii, no. 1, pp. 1–7. Washington, D.C., January 1925.

All members of the genus *Laelaps* are parasitic on vertebrates, especially ground-burrowing or ground-nesting mammals. Nine new species are here described, and a key is given to the species dealt with.

Zotta (G.). **Une espèce de *Leptomonas* n. sp., parasite du tube digestif de *Panorpa communis*.**—*C.R. Soc. Biol.*, xcii, no. 7, pp. 547–548. Paris, 27th February 1925.

What is possibly a new species of *Herpetomonas* (*Leptomonas*) is described from *Panorpa communis* in Rumania.

(K2627) Wt P.7/D.23 1,500 5/25 H & Sp Gp 52

Jegen (G.). **Die protozoäre Parasitenfauna der Stechfliege** (*Stomoxys calcitrans*). [The Protozoal Parasites of *S. calcitrans*.]—*Zeitschr. angew. Ent.*, xi, no. 1, pp. 149–151. Berlin, February 1925.

This is a summarised account of investigations in Switzerland, a full report of which has appeared elsewhere [*R.A.E.*, B, xiii, 31].

Aldrich (J. M.). **New Diptera or Two-winged Flies in the United States National Museum.**—*Proc. U.S. Nat. Mus.*, lxvi, art. 18, no. 2555, pp. 1–36, 1 fig. Washington, D.C., 1925.

The species described include *Cochliomyia laniaria*, Wied., of which the male and female are re-described, the characters distinguishing it from *C. macellaria*, F., being given; and *Microcalliphora flavifrons*, sp. n., from North Queensland labelled "ex carrion," the genus *Microcalliphora* being treated as distinct from *Chrysomyia*.

Memoranda on Medical Diseases in Tropical and Sub-tropical Areas.—4th edn., 275 pp., 131 figs. London, H.M. Stationery Office, 1924. Price 2*s.* 6*d.* net.

In this edition, compiled by W. P. MacArthur, an account is given of the commoner diseases of tropical and sub-tropical regions, with notes on their aetiology, symptoms and treatment, including a chapter on Arthropod vectors.

Comstock (J. H.). **An Introduction to Entomology.**—8vo, xix+1044 pp., 1228 figs. Ithaca, N.Y., The Comstock Pubg. Co., 1924. Price $6·00.

This is the first complete edition of this work, and incorporates the third edition of Part I, the second edition of which has already been noticed [*R.A.E.*, B, xii, 33], the most important amendments to this part being reference to the external anatomy, and the transfer of the bibliography to the general one (20 pp.) for the whole volume. Part II (pp. 290–990) presents a comprehensive and authoritative account of the classification (25 orders are recognised) and life-histories of American insects.

Representing as it does the culmination of its distinguished author's study of the subject for nearly fifty years, this volume will doubtless prove of the greatest service in providing the student with a very sound grounding in the elements of entomology, and at the same time serving as a standard treatise.

Dr. P. P. Calvert (*Ent. News*, xxxvi (1925), p. 95) has already drawn attention to the omission of reference to the human diseases carried by the Anoplura, and on p. 873 we notice the mis-spelling of *Glossina morsitans*, and its consequent misplacement in the index.

Goetghebuer (M.). **Notes biologiques et morphologiques sur** *Dasyhelea bilineata*, **Goetgh.**—*Encyc. ent.*, Ser. B ii, Dipt. i, pts. 3 & 4, pp. 121–124, 1 fig. Paris, Lechevalier, 1925.

Larvae taken in Belgium from water contained in the folded leaves of *Dipsacus sylvestris* proved to be those of the Ceratopogonine, *Dasyhelea bilineata*, Goetgh., originally described in 1920. The larva and pupa and the male and female adults are here described.

GOETGHEBUER (M.). **Contribution à l'étude des "prémandibules" chez les larves des Diptères némocères.**—*Encyc. ent.*, Ser. B. ii, Dipt. i, pts. 3 & 4, pp. 143–157, 11 figs. Paris, Lechevalier, 1925.

The contents of this paper are indicated by its title. In the CERATOPOGONINAE (which Malloch treats as a distinct family) the premandibles are present in the "Ceratopogoninae genuinae," *i.e.*, those insects that have terrestrial larvae with bristles or other cutaneous projections (*e.g.*, *Forcipomyia*, *Atrichopogon*), but are absent in the "Ceratopogoninae vermiformes," those with aquatic, smooth-skinned larvae (*e.g.*, *Culicoides*, *Palpomyia*, etc.). In the Orphnephilids they do not seem to occur at all. The brushes or flabellae of the larvae of Culicids, of Dixids, and undoubtedly of Simuliids also, are premandibles adapted to a special function.

SÉGUY (E.). **Notes sur les Moustiques, i & ii.**—*Encyc. ent.*, Ser. B. ii, Dipt. i, pts. 3 & 4, pp. 120, 157–158. Paris, Lechevalier, 1925.

Notes are given on certain species of mosquitos in Pandellé's collection, chiefly from Morocco and France. *Aëdes argenteus*, Poir. (*Stegomyia fasciata*, F.) must definitely be included in the catalogue of French species, having been recorded from many localities, the latest of which is Toulon, where it was found under circumstances where accidental introduction was out of the question.

GREENE (C. T.). U.S. Bur. Ent. **The Puparia and Larvae of Sarcophagid Flies.**—*Proc. U.S. Nat. Mus.*, lxvi, art. 29, no. 2566, pp. 1–29, 9 pls. Washington, D.C., 1925.

The determination of Sarcophagids in the immature stages has always been a matter of difficulty, and there has not been hitherto any attempt to classify the larvae or pupae. In the present paper tables are given to the pupae of 41 species and to the larvae of 5 species, with notes and descriptions of those dealt with.

FEY (K. Y.). **How to Control the House-flies.**—vi+166 pp., 12 figs. Shanghai Commercial Press, 1922. Price 12*c.* in Mex. (In Chinese.)

This is a brief description of house-flies, their life-history and habits, and remedial measures for them. Six species that occur in south-eastern China are described in detail.

KOEGEL (A.). **Die Fliegen als Schädlinge der landwirtschaftlichen Tierhaltung und ihre Bekämpfung.** [Flies as Pests of Animal Husbandry and their Control.]—*Landw. Hefte*, Heft 51–52, 52 pp., 13 figs. Berlin, Paul Parey, 1925. Price, *G.M.* 1.60.

This pamphlet, which deals with the Diptera attacking cattle, sheep and horses generally, and not merely with Muscids, is intended as an aid to avoiding the losses at present suffered in Germany through these pests. A general description of the morphology, biology and harmfulness of such injurious Diptera is followed by notes on the life-history, importance and control of each of the principal species.

KRÖBER (O.). **Beiträge zur Kenntnis palaearkt. Tabaniden. (Teil III :** *Ochrops, Atylotus, Tabanus* **s.str.,** *Baïkalia, Isshikia*). [Contribution to the Knowledge of Palaearctic Tabanidae. Part III.]—*Archiv Naturg.*, Abt. A, xc, no. 9, pp. 1–195. Leipzig, March 1925.

Keys to the species of *Ochrops, Atylotus* and *Tabanus* are given, with particulars of their geographical distribution.

The new species are *Tabanus pleskei* from Siberia, *T. syriacus* from Syria, and *T. caucasius* from the Caucasus.

ENDERLEIN (G.). **Studien an blutsaugenden Insekten. I. Grundlagen eines neuen Systems der Tabaniden.** [Studies on Blood-sucking Insects. I. The Basis of a new Classification of the Tabanidae.]—*Mitt. zool. Mus. Berlin,* xi, no. 2, pp. 253–409, 5 figs. Berlin, February 1925.

The keys to the subfamilies and genera of Tabanids in this work have already been noticed from a preliminary paper [*R.A.E.*, B, x, 226]. The classification adopted is based on wing venation and on the articulation of the antennae. There is a brief review of the position of Tabanids as regards disease transmission.

LINDNER (E.). **Neue exotische Dipteren (Rhagionidae et Tabanidae).** [New Exotic Diptera.]—*Konowia,* iv, no. 1–2, pp. 20–24. Vienna, 15th March 1925.

Coenura kröberi, sp.n., is described from Chile, the author provisionally adopting Enderlein's view that this genus should be placed in the TABANIDAE near *Pelecorhynchus.*

VILLENEUVE (J.). **Quelques mots sur les Tachino-Oestrides (Dipt.).**—*Konowia,* iv, no. 1–2, pp. 24–26. Vienna, 15th March 1925.

The characteristic features of the group of flies called " Tachino-Oestridae " by the author and " Oestridae dubiosae " by Brauer and Bergenstamm are discussed.

VILLENEUVE (J.). **Descriptions de nouveaux Tachino-Oestrides (Dipt.).**—*Konowia,* iv, no. 1–2, pp. 48–52. Vienna, 15th March 1925.

The following species are described : *Chaulioestrus capensis,* gen. et sp.n., from Cape Province ; *Xystomima umbrinervis* from Natal ; and *Proxystomima claripennis,* gen. et sp. n., from the Belgian Congo and S. Nigeria.

KESSEL (Q. C.). **A Synopsis of the Streblidae of the World.**—*Jl. N. Y. Ent. Soc.,* xxxiii, no. 1, pp. 11–33, 4 pls. Lancaster, Pa., March 1925.

The species dealt with include 6 new species and 1 new genus of Streblids parasitic on bats.

Dobroscky (D.). **External Parasites of Birds and the Fauna of Birds' Nests.**—*Biol. Bull. Marine Biol. Lab.*, xlviii, no. 4, pp. 274–281. Woods Hole, Mass., April 1925.

Lists of birds parasitised in Ithaca, N.Y., by flies of the genus *Protocalliphora* are given.

Wallace (F. N.) & others. **Report of the Division of Entomology.**—*6th Ann. Rept. Dept. Conservation Indiana 1924*, pp. 28–50. Indianapolis, Ind., 1925.

Owing to the wet season, mosquitos were unusually abundant in Indiana. They are often found breeding in roof-gutters that become clogged with leaves and hold water for a sufficient length of time for the life-cycle to be completed. Neglected sewer drains in basements are also a source of infestation of houses. *Cimex lectularius*, L. (bed-bug) has been unusually prevalent; the only practical treatment to be recommended is the use of petrol in all the cracks and crevices of bedsteads and floors as well as the seams and buttons of mattresses. This should be repeated within 10 days. Fewer outbreaks of *Ctenocephalus felis*, Bch., and *C. canis*, Curtis (cat and dog fleas) have been recorded than in previous seasons. *Xenopsylla cheopis*, Roths., and *Ceratophyllus fasciatus*, Bosc., have been taken from rats caught in Indianapolis, but no infestation of houses by these fleas is recorded.

Henry (—) & Leblois (—). **Gale céphalique chez un perroquet.**—*Rev. vét.*, lxxvii, no. 3, p. 173. Toulouse, March 1925.

A case of psoroptic mange is recorded in a parrot, the mite causing it being apparently a variety of *Cnemidocoptes mutans*. Applications of cresylic oil 1 : 50, repeated at 8 days' interval, will kill this parasite.

Dorat (—), Massy (—) & Marquis (—). **Sur un extrait de Pyroligneux de Thuya et son application en médecine vétérinaire.**—*Bull. Soc. Sci. nat. Maroc*, iv, no. 8, pp. 214–217. Rabat, 31st December 1924.

An account is given of experiments that show the value of a pyroligneous extract from *Callitris quadrivalvis*, a tree allied to *Thuja*, in the treatment of mange. The preparation, characters and composition of the extract are described, and an ointment prepared from it proved superior to the ordinary vegetable tars.

Uriarte (L.). **Pulicidés des Rats de Buenos-Aires.**—*C.R. Soc. Biol.*, xcii, no. 10, pp. 831–832. Paris, 20th March 1925.

From a large number of the rats, *Mus norvegicus* (*decumanus*), *M. rattus* and *M. alexandrinus*, captured at Buenos-Aires, 123 fleas were taken in the following order of abundance: *Xenopsylla* (*Loemopsylla*) *cheopis*, Roths., 119; *Ctenocephalus* (*Pulex*) *felis*, Bch., 3; and *Pulex irritans*, L., 1.

Fox (C.). **A New Genus of the Siphonaptera.**—*Ent. News*, xxxvi, no. 4, p. 121. Philadelphia, Pa., April 1925.

Actenophthalmus, gen. n., is erected for *Ctenophthalmus heiseri*, McCoy, from California.

[Pavloski (E. N.).] **Павловский (Е. Н.). К биологии личинок сырной мухи в связи с ложнопаразитизмом их у человека.** [On the Biology of the Larvae of *Piophila casei*, L., in connection with their Parasitism of Man.]—Separate from **"Сборник Научн. Трудов в честь 50-летия научно-врачебн. Деятельности глав. Врача Обуховской больнице проф. А. А. Нечаева"** [*Collection Sci. Works in Honour of the 50-Years Activities in Med-Sci. of A. A. Netchaeva at the Obukhov Hospital*], 7 pp. Petrograd, 1922. [Received 7th April 1925.]

A case of intestinal infection by *Piophila casei*, L., in man is described, and similar previous records are reviewed. The larva is swallowed with food and may live for some time. The life-history and control of this fly is quoted from Sakharov [*R.A.E.*, A, x, 91]. The larvae are very resistant and have been found to be alive (and eventually pupate) after being left without food for 8 months in a corked test tube. These powers of resistance of the larvae must be taken into consideration when adopting remedial measures.

Departmental Activities.—*Jl. Dept. Agric. Union S. Africa*, x, no. 3, pp. 201–202 & 213–214. Pretoria, March 1925.

As a result of E. V. Cowdry's investigations on heartwater in cattle, sheep and goats in South Africa, a *Rickettsia* has been isolated from various parts of the body of the diseased animals. It could not be traced in healthy animals, but was found in the tick, *Amblyomma hebraeum*, which had fed on infected animals and was capable of producing the disease. Non-infected ticks did not show the micro-organism.

A Sarcophagid, *Wohlfahrtia* sp. (grey locust-fly), was observed depositing about 150 maggots on a piece of horse-meat. The development of these maggots was watched. After feeding for four days they crawled away and burrowed into the sand, where they remained quiescent. They entered the pupal stage on the 19th day after they were deposited. The pupal stage lasted 30 days, the first adults emerging on 4th November.

Cernaianu (C.). **Sur une épizootie de piroplasmose vraie du Cheval et son agent vecteur.**—*C.R. Soc. Biol.*, xcii, no. 9, pp. 730–731. Paris, 13th March 1925.

The cases of equine piroplasmosis here described are apparently the first definite records of the transmission of *Piroplasma caballi* by *Dermacentor reticulatus*, F., in Rumania.

Lestoquard (F.). **Troisième note sur les piroplasmoses du mouton en Algérie. La piroplasmose vraie : *Piroplasma* (s.str.) *ovis* (nov. sp.). Comparaison avec *Babesiella ovis*.**—*Bull. Soc. Path. exot.*, xviii, no. 2, pp. 140–145, 1 fig. Paris, 11th February 1925.

Piroplasma ovis, sp.n., is described from sheep in Algeria. The course of the disease produced by it is discussed, and the organism is compared with *Babesiella ovis*. Natural infection of goats by *P. ovis* is also recorded.

LEBLANC (L.). **Existence du Bouton d'Orient à Figuig (Maroc oriental).** —*Bull. Soc. Path. exot.*, xviii, no. 2, pp. 146–148. Paris, 11th February 1925.

Cases of Oriental sore are described from Figuig, where sandflies are abundant from May to October, the species recorded by Sergent [*R.A.E.*, B, iii, 29] being *Phlebotomus papatasii* and *P. minutus africanus*.

DELANOË (P.). **Au sujet de la détermination spécifique des puces provenant des Indigènes marocains.**—*Bull. Soc. Path. exot.*, xviii, no. 2, pp. 149–152. Paris, 11th February 1925.

The fleas caught in traps in Morocco [*R.A.E.*, B, x, 101] all prove to be *Pulex irritans*, L. Of 71 fleas collected from a jackal 62 were *P. irritans*, 8 *Ctenocephalus canis*, Curtis, and one resembled *Xenopsylla cheopis*, Roths. *P. irritans* is considered the principal carrier of plague in Morocco. As the insects do not retain the virus indefinitely, the complete disappearance of the disease from certain areas where systematic treatment of the patients has been carried out is thus explained.

DELANOË (P.). **A propos de la puce du porc. Le porc hôte électif de la puce de l'homme.**—*Bull. Soc. Path. exot.*, xviii, no. 2, pp. 191–198. Paris, 11th February 1925.

In discussing Roubaud's statements regarding the importance of pigs and other animals as hosts of various ectoparasites of man [*R.A.E.*, B, v, 36], it is pointed out that *Pulex irritans* abounds among pigs in Morocco, the latter being apparently preferred to man. The infested pig-sties are a source of real danger in the event of a plague epidemic [see preceding paper], and the possibility of reducing this danger is discussed. It is also suggested that pigs properly cared for at a certain distance from human habitations might help to keep the latter free from fleas.

ROUBAUD (E.). **Les principes directeurs de la prophylaxie pratique du paludisme.**—*Bull. Soc. Path. exot.*, xviii, no. 2, pp. 199–214. Paris, 11th February 1925.

In discussing Marchoux's recent paper [*R.A.E.*, B, xiii, 62], anti-malarial work in various countries is reviewed, and it is pointed out that the relative value of various methods such as measures against mosquito larvae and the protection of man by the presence of domestic animals must depend entirely on local conditions.

CONNAL (A.). **Entomology.**—*Nigeria: Ann. Med. & Sanit. Rept. 1923*, pp. 19–23. Lagos, 1924. [Received 16th March 1925.]

Lists are given of the biting flies taken in various localities.

Of the mosquitos collected *Taeniorhynchus* (*Mansonioides*) *africanus* greatly outnumbered all other species. In over 3,000 individuals examined, larvae of *Filaria* were found in the proboscis of one and in the muscles of the head and thorax of another.

The daily inspection of houses during 1923 in the Lagos area showed the mosquitos to be in the same order of abundance as in the previous year [*R.A.E.*, B, xii, 97]. Additional species recorded are *Aëdes* (*Ochlerotatus*) *irritans*, *A.* (*Stegomyia*) *luteocephalus*, *Lutzia* (*Culex*) *tigripes* and *Culex insignis*.

Duke (H. L.). **Trypanosomiasis Investigations.**—*Uganda Prot. Ann. Rept. Bact. Dept. 1924*, pp. 8–10. Entebbe, 1925.

The work of the year in connection with *Glossina palpalis* and various strains of trypanosomes is briefly reviewed [*cf. R.A.E.*, B, xiii, 41]. There is no cause for apprehension about the success of the efforts made during the last five years to reclaim the fertile territory along the shore of Lake Victoria, though the indigenous polymorphic trypanosome still exists in the fly on Damba Island and probably elsewhere in the lake area. The return of man may, to some extent at least, have eliminated the antelope as a host for the fly in the repopulated area, and in the absence of mammalian hosts other than man the trypanosome may die out in places where it flourished a few years ago. The introduction of human trypanosomes from areas adjoining the reclaimed territory must be guarded against, though it is not so much the reappearance of sleeping-sickness that is to be dreaded as the recrudescence of the conditions under which the human trypanosomes can spread in epidemic form.

Balfour (A.), Van Campenhout (E.), Martin (G.) & Bagshawe (A. G.). **Interim Report on Tuberculosis and Sleeping-sickness in Equatorial Africa.**—*League of Nations, Health Organisation*, C.8, M.6, iii, 122 pp., 10 maps. [Constable & Co., London] 1924. [Received 26th March, 1925.]

This is a compilation of various reports showing the present distribution of sleeping-sickness in tropical Africa. The situation with regard to the disease in various regions is discussed, and notes are given on the prophylactic and general measures that have been followed during recent years with considerable success.

Extract from the Annual Report of Dr. R. R. Scott, M.C., Medical Officer of Health, Dar-es-Salaam.—*Tanganyika Terr. Ann. Med. Rept. 1923*, pp. 47–70. [London] 1925.

In spite of a very low rainfall the incidence of malaria remains high at Dar-es-Salaam. The search for breeding-places of mosquitos and the maintenance of drains have been continued. There has been a slight reduction in the total collections of Anopheline larvae. The chief breeding-places of Anophelines are recorded. Tsetse-flies caught near the town in July were identified as *Glossina morsitans*, *G. brevipalpis* and *G. pallidipes*. Seven cases of relapsing fever were notified, but not a single tick, *Ornithodorus* [*moubata*], was found in any of the houses of the infected persons.

Human Trypanosomiasis in the Mwanza District.—*Tanganyika Terr. Ann. Med. Rept. 1923*, pp. 89–92. [London] 1925.

This is a summary of the reports received from the medical officers who visited the sleeping-sickness area in October 1923. Observations

made during 1923 confirm the view that the vector of the disease is *Glossina swynnertoni*, and the causal agent *Trypanosoma rhodesiense*. The symptoms and course of the disease are those of the Rhodesian type of sleeping-sickness though, possibly, somewhat less acute. The presence of numerous trypanosomes in the peripheral circulation is a feature common to both forms and distinguishes them from sleeping-sickness of the Uganda type. The removal of natives from the neighbourhood of the forest seems to have checked the disease in some districts, but there does not appear to have been any marked diminution during 1923 in the total number of deaths in the infected area as a whole. The disease shows no tendency to assume epidemic form. The known distribution of Rhodesian sleeping-sickness is being extended, and it is considered likely that the disease will be found wherever game infected with the *brucei* form of trypanosome, human beings, and *Glossina* of the *morsitans* type are brought into contact in large numbers.

KELKAR (D. G.). **Appendix iii, Section iv. Entomology.**—*Tanganyika Terr. Ann. Med. Rept. 1923*, pp. 156–158. [London] 1925.

This is part of the annual report of the sub-assistant surgeon in medical charge, Anglo-Belgian Boundary Commission.

Anopheline mosquitos were found breeding in small collections of stagnant water and slowly running streams, also in the collection of water at the roots of banana trees. *Ornithodorus moubata* and larvae of *Auchmeromyia luteola* were observed in native huts in camps.

GORDON (R. M.). **A Note on two Vesicant Beetles belonging to the Family Staphylinidae.**—*Ann. Trop. Med. & Parasit.*, xix, no. 1, pp. 47–52, 1 pl. Liverpool, 31st March 1925.

The species concerned are *Paederus amazonicus*, Sharp, from Brazil, and *P. sabaeus* from Sierra Leone. The lesions caused by these Staphylinids have been produced experimentally, and are described in detail. When allowed to wander freely over the bare arm no reaction, either immediate or delayed, was produced, but lesions occurred if the beetles were irritated. Under the microscope, minute drops of fluid could be seen exuding from the labial orifice when the insects were compressed in a live-box.

ROBERTS (J. J.). **On the Bionomics of** *Hippobosca equina*.—*Ann. Trop. Med. & Parasit.*, xix, no. 1, pp. 81–89. Liverpool, 31st March 1925.

The following is from the author's summary : *Hippobosca equina* has a limited distribution in North Wales, and is restricted to certain valleys in South Carnarvonshire and Merionethshire. Its distribution seems to be governed by two factors—presence of bracken, on which depends successful pupation, and the amount of sunshine available. The chief hosts of *H. equina* are horses and cattle, although evidence is available to show that it attacks dogs. Extension of range seems to be kept in check by a policy of destruction when stock is removed from its haunts or when an individual is noted in a new district. As an economic pest it is a source of annoyance in terrifying animals not accustomed to its presence, and may then give rise to grave consequences. This factor appears of less importance since the diminution

of horse transport. It now occurs almost entirely on cattle and confines its activities to blood-sucking. It was found impossible to keep the fly alive and conduct breeding experiments under laboratory conditions. The fly is generally found from May to August. Pairing takes place on the host animals. It seems probable that the decaying humus beneath growing bracken is the normal situation for deposition of larvae.

EVANS (A. M.). **Notes on the Culicidae collected in Sierra Leone, with Descriptions of a New Species and New Variety.**—*Ann. Trop. Med. & Parasit.*, xix, no. 1, pp. 119–126, 1 pl. Liverpool, 31st March 1925.

The species recorded include *Aëdes* (*Stegomyia*) *blacklocki*, sp.n., and *A.* (*Aëdimorphus*) *cumminsi* var. *daruensis*, n.

NEWSTEAD (R), EVANS (A. M.) & POTTS (W. H.). **Report on the Investigation into the Destruction of Vermin by Hydrogen Cyanide, with Especial Reference to Bed Bugs.**—*Ann. Trop. Med. & Parasit.*, xix, no. 1, pp. 91–118, 6 figs., 1 pl. Liverpool, 31st March 1925.

These experiments were carried out in a lethal chamber, and finally on board ship, in order to ascertain the efficacy of various strengths of hydrocyanic acid gas in the destruction of vermin, especially *Cimex lectularius*, under natural conditions on board ship. The technique employed is described in detail. Other insects experimented on were *Pediculus capitis*, *P. humanus* (*corporis*), and *Ceratophyllus fasciatus*. It is recommended as a result that a concentration of 0·3 per cent. of hydrocyanic acid gas acting for a period of 3 hours be used. This will kill all individuals (eggs not being more resistant than adults), except where they can retire behind tongue and groove boarding. Where this is present, one or two boards, should be removed to allow the gas to penetrate into the cavity behind. For the same reason bunks of hollow metal tubing should be taken to pieces, when this is practicable, and the tubular portions laid horizontally, or preferably, the ends should be hermetically sealed.

Concentrations of 0·3 per cent. acting for one hour will kill both the adults and eggs of *Pediculus humanus* (*corporis*) and *P. capitis*, but lower concentrations for a longer period are not effective. Both fleas, *Ceratophyllus fasciatus* (adults and larvae), and rats are killed by 0·2 per cent. acting for 3 hours.

The spraying method of applying the cyanide gives a more uniform concentration throughout the area than when the dumping method is used.

In an appendix by W. H. Roberts notes are given on the lethal chamber used and the methods of obtaining a concentration of 0·3 per cent. of gas in it.

TRIMBLE (H. E.). **The Vacuum-Cyanide Method of delousing Clothing and Baggage.**—*Pub. Health Repts.*, xl, no. 8, pp. 335–351, 3 pls. Washington, D.C., 20th February 1925.

A number of experiments are described in which fumigation was tried as a substitute for the steam method of destroying *Pediculus humanus* in clothing and baggage. The method of breeding lice for the experiments is described, and the results of fumigation with many

gases are shown in tables. Ether, chloroform, carbon bisulphide, formaldehyde and carbon tetrachloride were all tried and all, except the last two (which were ineffective), presented some factor, such as inflammability, cost, etc., which precluded their general use. Hydrocyanic acid gas, and a mixture of it with cyanogen chloride (CNCl), proved the most efficient insecticides, but penetrate fabrics so slowly that they are applicable to disinfection of clothing and baggage only when aided by an initial vacuum, the higher the vacuum the quicker and deeper being the penetration. As CNCl-HCN has rather unpleasant effects, the latter alone is used in preference, and is just as effective, readily killing both lice and their eggs. Moreover, the odour and lachrymatory effect of the CNCl-HCN mixture may disappear while leaving a dangerous amount of HCN in the fabrics. The minimum lethal concentrations of either gas for fully exposed lice and their eggs, with 15 minutes' exposure, was found to be that from about 18 oz. of sodium cyanide per 1,000 cu. ft. Vacuums of 26 in. of mercury and air pressure of 15 lb. and combinations of these, used without gas over longer periods of time than those used in actual practice, have no effect on lice or their eggs. An air pressure of 15 lb. does not aid the penetration of the gas. A secondary vacuum is a help in clearing gas out of bundles of clothing. The vacuum hydrocyanic acid gas method as prescribed for the fumigation of imported compressed cotton bales was tried repeatedly, but failed to destroy lice or eggs protected by 16 to 24 folds of wool blanket. The recommendations for using this process at the New York quarantine station are that hydrocyanic acid gas should be the routine agent for freeing the clothing of immigrants from lice, using from 143 to 285·7 oz. sodium cyanide per 1,000 cu. ft. (12 oz. to 24 oz. per chamber of 84 cu. ft.), or from 72 to 143 fluid oz. of liquid HCN, with the initial vacuum 26 ins., and with 30 minutes' exposure. The clothing and baggage should be placed on wire racks, thus separating them somewhat, and after fumigation, the clothing should be hung up in a stream of fresh air until the odour of gas disappears. For baggage, the exposure should be 1 hour, and the covers of trunks and other large cases should be opened. The clothing of immigrants suffering from or exposed to typhus should be sterilised by the vacuum steam pressure process, any articles that steam would injure being subjected to the vacuum cyanide process.

Shannon (R. C.). **Brief History of Egg-laying Habits of** *Dermatobia*.—*Jl. Wash. Acad. Sci.*, xv, no. 6, pp. 137–138. Baltimore, Md., 19th March 1925.

Dermatobia hominis, Say, of tropical America, attacks numerous warm-blooded animals, including man. It lays its eggs, usually 8-10, on the lower surface of the abdomen of blood-sucking mosquitos. The larvae hatch while the mosquito feeds, and burrow under the skin of their future host. In practically all cases observed, the mosquitos were *Psorophora* (*Janthinosoma*) *lutzi*, though the author has found a batch of eggs on a non-blood-sucking mosquito, *Goeldia longipes*, in Panama.

Whittingham (H. E.). **The Aetiology of Phlebotomus Fever.**—*Jl. R.A.M.C.*, xliv, no. 3, pp. 196–203. London, March 1925.

This paper on sand-fly fever, transmitted by *Phlebotomus papatasii*, has been noticed from another source [*R.A.E.*, B, xii, 188].

CHRISTOPHERS (S. R.). **Indian Kala Azar Commission.**—*Nature*, cxv, no. 2890, pp. 421–422. London, 21st March 1925.

A very brief review is given of the work in connection with the treatment and aetiology of kala-azar in India, as well as its possible transmission by *Phlebotomus argentipes* [*R.A.E.*, B, xiii, 30].

CRAGG (F. W.). **Observation on the Reproductive System of *Cimex* : Impregnation.**—*Ind. Jl. Med. Res.*, xii, no. 3, pp. 451–455. Calcutta, January 1925.

The contents of this paper are indicated by its title.

SINTON (J. A.). **Notes on some Indian Species of the Genus *Phlebotomus*. X. Abnormalities in the Appendages of some Specimens of *Phlebotomus*.**—*Ind. Jl. Med. Res.*, xii, no. 3, pp. 467–469, 1 pl. Calcutta, January 1925.

Among over 2,000 specimens of *Phlebotomus* spp. examined by the author from different parts of India, abnormalities were found involving the wings, the palps, the antennae and the male genitalia. These are here described ; they were in some case unilateral, but in others they were bilateral, and if their true character were not recognised, they might give rise to erroneous records of new species.

SINTON (J. A.). **The Indian Rat Fleas, with Special Reference to the Identification of the "Plague Fleas."**—*Ind. Jl. Med. Res.*, xii, no. 3, pp. 471–477, 2 pls. Calcutta, January 1925.

This note is published in the hope that it may be of assistance to workers investigating the degree of infectivity of rat fleas as regards the transmission of plague to man. Keys are given to the genera and species, with a table showing the geographical distribution and relative prevalence of the different species in India identified by Cragg. The methods of collection, preservation and preparation of the fleas for examination adopted by Cragg, are described.

HUTCHINSON (C. M.). **Micro-Anatomy of *Cimex* with Special Reference to the Technique of Insect Histology.**—*Ind. Jl. Med. Res.*, xii, no. 3, pp. 487–498, 3 pls. Calcutta, January 1925.

The object of this work was to obtain further information as to the minute anatomy of *Cimex hemiptera*, F. (*rotundatus*, Sign.), and to present the results in such a form as to be of assistance to investigators on the subject of the possible incrimination of *Cimex* as a carrier of kala-azar.

Examination by sectioning bed-bugs, fed both on cultures of parasites and on peripheral blood of untreated kala-azar patients, failed to show any case of penetration of the wall of the gut by the parasite or the occurrence of the latter in any tissues of the body. This negative evidence, in addition to that of other workers, indicates the general conclusion that *Cimex* is not a natural host of *Leishmania* (*Herpetomonas*) *donovani*. In view, however, of the remarkable power of the parasite of living and multiplying in the gut of this host, and of the possibility of contaminative infection through the agency of faecal distribution, it seems inadvisable to treat *Cimex* as if it had no relation to kala-azar.

Senior-White (R.). **The Eradication of Malaria from a Rubber Estate.**—*Ind. Jl. Med. Res.*, xii, no. 3, pp. 545–551. Calcutta, January 1925.

Details are given of the measures employed on a rubber estate in India for the eradication of malaria, showing that the expenditure necessary for work against mosquitos is much less than the losses resulting from its neglect owing to deaths, sickness and expenditure on treatment.

The only malaria carrier of importance was *Anopheles maculatus*, which bred chiefly in springs. Oiling was the principal measure employed, and was carried out by inserting in the actual spring pieces of sacking soaked in the semi-solid residue that accumulates at the bottom of the tanks where the crude-oil residue used for driving the factory engines is stored. This gives a film that moves slowly down the course of the issuing streamlet, and lasts about two days. A complete film is seldom formed, but this does not seem to be necessary in dealing with *A. maculatus*.

Strickland (C.). **On the Larvae of some Indian** *Anopheles*.—*Ind. Jl. Med. Res.*, xii, no. 3, pp. 561–563, 2 pls. Calcutta, January 1925.

Notes are given on the structure of the larvae of *Anopheles lindesayi*, Giles, *A. gigas*, Giles, *A. jamesi*, Theo., *A. fuliginosus*, Giles, and *A. willmori*, James.

Christophers (S. R.), Shortt (H. E.) & Barraud (P. J.). **The Development of the Parasite of Indian Kala-azar in the Sandfly** *Phlebotomus argentipes* **Annandale and Brunetti.**—*Ind. Jl. Med. Res.*, xii, no. 3, pp. 605–607. Calcutta, January 1925.

In view of recent discoveries [*R.A.E.*, B, xiii, 30], a number of sandflies, *Phlebotomus argentipes*, were captured, and attempts were made to induce them to feed on kala-azar patients. With great difficulty a small proportion of the captured flies were successfully fed and subsequently dissected. The results of these and former observations [*loc. cit.*] definitely prove that the flagellates seen in some of the flies are developmental forms of the parasite of kala-azar [*Leishmania donovani*]. The formation of flagellate forms and multiplication such as occurs in culture may therefore be considered as occurring in *P. argentipes* with some regularity, when these flies are fed on the peripheral blood of kala-azar patients. A search for *P. argentipes* during November and December in houses where recent cases of kala-azar had occurred proved almost entirely negative ; the midges occurred almost exclusively in stables and without any definite relation to the incidence of the disease.

Brug (S. L.). **De geographische verbreiding der muskieten in Nederlandsch Oost-Indië.** [The Geographical Distribution of Mosquitos in the Dutch East Indies.]—*Geneesk. Tijdschr. Nederl.-Indië*, lxv, no. 1, pp. 1–8. Batavia, 1925.

In the Dutch East Indies there is no sharp dividing line between the Oriental and Australian mosquito faunas. Up to the present no

Australian species have been found in Celebes. In the Sula islands two Australian species occur, although the straits separating Celebes from them is narrower than the expanse of sea eastwards of them. The Lesser Sunda islands have a predominantly Oriental mosquito fauna. One of the two Australian species there does not reach farther than Timor, while the other, *Aëdes* (*Stegomyia*) *variegatus*, has an extensive though discontinuous distribution in the Pacific, though it is absent from Java and Sumatra. In the Moluccas the Oriental species still predominate, but there is a greater invasion of Australian species than in the Lesser Sunda islands. New Guinea is more Australian. Some Oriental species penetrate to Australia and even to the islands of the Pacific. If it is desired to draw a line between faunas "chiefly Oriental" and "chiefly Australian," it must run eastwards of the Moluccas and Lesser Sunda islands and westwards of New Guinea and Australia.

Fletcher (T. B.). **Report of the Imperial Entomologist, 1923-24.**—*Sci. Repts. Agric. Res. Inst., Pusa, 1923-24*, pp. 52–60. Calcutta, 1924. [Received 30th March 1925.]

The warble-fly attacking cattle in India is *Hypoderma lineatum*, Vill., and not *H. bovis*, DeG., as has been supposed. The possible connection between *Culicoides* and the transmission of kala-azar is being studied; from breeding-places in Calcutta *C. oxystoma*, Kieff., and another species, which is probably *C. macrostoma*, Kieff., have been reared. The life-histories of several species of Tabanids have been worked out, and the manner of feeding of the larvae of *Tabanus tenens*, Wlk., is described.

Owing to the presence of small fish and aquatic bugs, few mosquito larvae are found in the rice-fields around Pusa; those obtained included *Anopheles fuliginosus*, Giles, *A. hyrcanus*, Pall. (*sinensis*, Wied.) and *Culex vishnui*, Theo. *Culex fatigans*, Wied., *C. vishnui* and *A. subpictus*, Grassi (*rossi*, Giles) breed in wells. A study was made of *Mucidus scatophagoides*, Theo., which is on the wing about July. The indications are that eggs are deposited normally in situations where they become thoroughly desiccated and so remain until hatched by the first monsoon rains.

Galli-Valerio (B.). **Beobachtungen über Culiciden, nebst Bemerkungen über Tabaniden, Simuliden und Chironomiden.** [Observations on Culicids, with Remarks on Tabanids, Simuliids and Chironomids.]—*Centralbl. Bakt. Paras. Infekt.*, Ite Abt. Orig., xciv, no. 5, pp. 309–313. Jena, 10th March 1925.

At Vidy, Switzerland, young larvae of *Theobaldia annulata*, Schr., were found in November 1923. Larvae of *T. annulata*, *Anopheles bifurcatus*, L., and *Aëdes communis*, DeG. (*Culex nemorosus*, Mg.) were abundant throughout the winter; some larvae of *Anopheles maculipennis*, Mg., also hibernated. Adults of the three first species were bred out in the laboratory in April, thus confirming the view that hibernating mosquito larvae do not, even at favourable temperatures, develop so quickly as summer ones. Out of doors pupae (*Aëdes communis*) occurred in June, in which month also the first young larvae of *Anopheles bifurcatus* and *A. maculipennis* were seen. *A. bifurcatus* oviposited again in September, young larvae appearing in October.

The influence of aquatic plants on the breeding-places of Culicids was very marked. Areas in a lake covered with *Lemna palustris* and other water plants contained only a few Culicine larvae and no Anophelines, whereas places free from these plants harboured many larvae of *A. bifurcatus* and even more of *A. maculipennis*.

Females can live for a long period in winter without food and with only a little water. A female of *T. annulata* placed in a container with a little water in November 1923 lived until 4th April 1924, the temperature being 16°–18°C. [60·8°–64·4°F.]. Dry eggs of *Aëdes argenteus*, Poir. (*Stegomyia fasciata*, F.) despatched from Cuba on 28th November were received at Lausanne on 20th December. They were at once placed in water at 25°C. [77°F.] and hatched out on 31st December. Pupation began on 4th January, the adults emerging on 6th January. The adults of this mosquito can pass wire gauze with a $\frac{3}{4}$-mm. mesh.

In the summer of 1924 Tabanids on Alpine pastures included *Tabanus aterrimus*, Mg., *T. apricus*, Mg., *T. sudeticus*, Zell., *T. bromius*, L., *T. glaucopis*, Mg., and *Haematopota pluvialis*, L.

Simulium gallii, Edw., was very common on the mountains in the summer of 1924. *Corynoneura innupta*, Edw., a Chironomid first described from England in 1924, occurred in large swarms in August 1924 at about 8,900 feet, covering the author, but not biting.

Dobbrick (W.). **Über das Vorkommen von** *Anopheles maculipennis* **Mg. in der Kaschubei.** [Occurrence of *A. maculipennis* in Kaschubei.]—*45-46 Ber. Westpreuss. bot.-zool. Ver.*, pp. 29–31. Danzig, 1924.

Anopheles maculipennis, Mg., is recorded from various places in West Prussia.

Martini (E.). **Zwei bemerkenswerte Culiciden von einem eigenartigen Biotop.** [Two remarkable Culicids from a peculiar Habitat.]—*Internat. Rev. d. ges. Hydrobiol. u. Hydrographie*, xii, no. 5–6, pp. 333–337. [Leipzig, n. d.].

Theobaldia glaphyroptera, Schiner, is a European mosquito of which little is known and very few records exist. Its larva is here described from numerous specimens taken in pools in the Schwarza River, Germany, which form when the general water level has fallen in summer. Some of these also contained *Culex torrentium* sp. n., of which both larvae and adults are described.

Falleroni (D.). **Studio sugli Anopheli** *maculipennis* **delle Paludi Pontine.** [A Study of the Anophelines, *Anopheles maculipennis*, of the Pontine Marshes.]—Recanati, 1924. (Abstract in *Ann. d'Igiene*, xxxv, no. 1, p. 84. Rome, January 1925.) [Received 2nd April 1925.]

Anopheles maculipennis has two forms in the Pontine marshes, differentiated by the characters of the eggs. These are either grey or black, and the rafts vary in shape and arrangement. The black eggs predominate in the hot months. Further observations are being made

to ascertain if the variation extends to the larvae and adults. The possible existence of two varieties, prevalent at different seasons and temperatures, may be of epidemiological importance. The author finds that the hypertrophy of the malphigian tubes is not connected with hibernation as stated by Roubaud [*R.A.E.*, B, xi, 163] but rather is associated with the reproductive function. A female can oviposit as many as 9 times. In one case 1,431 eggs were produced, of which 1,289 were laid. As regards the prevention of malaria the author advises the keeping of animals that are attractive to Anophelines and the capture of the adults of the hibernating and first two summer generations.

Mühlens (P.) & Sfartchich (A.). **Malaria in Dalmatia and Herzegovina.**—[Monthly Bulletin of the Ministry of Public Health, Jugo-Slavia, May-July 1924.] (Abstract in *Ann. d'Igiene*, xxxv, no. 1, pp. 94–95. Rome, January 1925.) [Received 2nd April 1925.]

In 1922 the Ministry of Public Health for Jugo-Slavia established at Trouir an institute for the study and prevention of malaria and also anti-malarial stations at Spalato and Metkovitch. The disease is general and severe. The sole Anopheline that seems responsible is *Anopheles maculipennis*. *A. elutus* and *A. algeriensis* also abound, but the majority of these live in animal quarters. The larvae are abundant in waters in the interior, but do not occur in the brackish coastal marshes or in rain-water cisterns. Several drainage schemes have been carried out.

Ruchadze (N.). **Die Bekämpfung der Malaria in Gagry (Georgien-Kaukasus) im Jahre 1923.** [Work against Malaria at Gagry, Georgia, in 1923.]—Suchum, 1924. (Abstract in *Arch. Schiffs- u. Trop.-Hyg.*, xxix, no. 4, pp. 193–194. Leipzig, 1st April 1925.)

Gagry was notorious for malaria until early in the present century, when indigenous malaria was reduced to 10 per cent. After the Russian revolution, health conditions deteriorated, and in 1922 90 per cent. of the population were infected. In 1923 the authorities decided on taking action, primarily by anti-larval measures such as oiling and draining stagnant waters, with the result that there was a marked improvement in the situation in 1924. The Anophelines found at Gagry are *Anopheles maculipennis* and *A. bifurcatus*.

[Reinhard (L.).] **Рейнгард (Л.). Новый вид малярийного комара *Anopheles* для Екатеринославской губернии : *Anopheles pseudopictus*.**—[*A. pseudopictus* a Malarial Mosquito new to Ekaterinoslav.] — **Екатеринославс. Медиц. Жур.** [*Ekaterinoslav Med. Jl.*], 1924, separate 3 pp.

At present three Anophelines are known from the Government of Ekaterinoslav, Ukraine, *Anopheles bifurcatus*, *A. maculipennis* and *A. hyrcanus* (*pseudopictus*). As the last-named is a new record for this district, a description of it is given.

[Reinhard (L. V.).] **Рейнгард (Л. В.). К вопросу о паразитах, находимых у малярийного комара** *Anopheles*. (**Предварительное сообщение.**) [On Parasites found in the Malaria Mosquito *Anopheles*. (Preliminary Note.)] — **Екатеринославс. Медиц. Жур.** [*Ekaterinoslav Med. Jl.*], 1924, pp. 807 809. [Received 7th April 1925.]

An undetermined *Filaria* was isolated from an adult of *Anopheles maculipennis* that emerged in the laboratory from pupae taken in the open in Ukraine, showing that infection had probably been acquired in the larval stage. Other parasites recorded from *A. maculipennis* are *Hydrachna* sp. and Trematodes. Cysts containing the latter occurred in various parts of the body of the mosquitos.

[Shtchelkanovtzev (Ya. P.).] **Щелкановцев (Я. П.). К биологии малярийного комара и малярийного паразита, по литературным данным последнего времени и своим наблюдениям.** [On the Biology of the Malaria Mosquito and Malaria Parasite according to recent Literature and Personal Observations.]—**Юго-Восточный Вестник Здравоохранения** [*South-Eastern Herald of Health Preservation*], 1924, no. 5–6, separate 11 pp. [Received 23rd March 1925.]

This is a brief review of recent literature concerning the life-history and habits of Anophelines, including the development of the malarial parasite. Much of the work is confirmed by personal observations.

Headlee (T. J.). **Report of Mosquito Work.**—*Ann. Rept. New Jersey Agric. Expt. Sta., 1922-23*, pp. 324–337, 3 pls. New Brunswick, N.J., 1924. [Received 6th April 1925.]

The inspection and drainage work in New Jersey in the year ended 30th June 1923 is described. The information concerning the relation between atmospheric conditions and mosquitos, briefly reviewed by W. Rudolfs, has already been noticed from a more detailed account [*R.A.E.*, B, xii, 74]. W. M. Walden discusses the prevalence of mosquitos on the wing. In spite of the installation of emergency pumps and oiling apparatus, an exceptional number of mosquitos emerged. These conditions were produced by the abnormal rainfall. The prevailing species were *Aëdes cantator* and *A. sollicitans* from the salt marshes, *A. vexans* (*sylvestris*) from the fresh water swamps, and *Culex pipiens* from the city breeding-places.

Russell (P. F.). **Identification of the Larvae of the Three Common Anopheline Mosquitos of the Southern United States.**—*Amer. Jl. Hyg.*, v, no. 2, pp. 149–174, 5 figs. Baltimore, Md., March 1925.

The importance of the identification of mosquito larvae when surveying breeding-grounds is pointed out, and as existing keys have proved insufficient for this purpose, additional information and keys are given for the identification of *Anopheles quadrimaculatus*, Say, *A. punctipennis*, Say, and *A. crucians*, Wied., the three common Anophelines of the southern United States.

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Dyar (H. G.) & Shannon (R. C.). **The Mosquitos of Peary's North Pole Expedition of 1908 (Diptera, Culicidae).**—*Jl. Wash. Acad. Sci.*, xv, no. 4, pp. 77–78. Baltimore, Md., 19th February 1925.

The mosquitos collected on Peary's North Pole expedition of 1908 were *Aëdes pearyi*, sp. n., and *A. labradorensis*, sp. n., from Labrador; *A. alpinus*, L., from Greenland; and *A. cantator*, Coq., from Nova Scotia, the first authentic record of this species from Canada.

Transactions of the Fifth Biennial Congress held at Singapore, 1923.—*Far Eastern Assoc. Trop. Med.*, xx+974 pp., 86 pls., numerous charts. London, 1924. [Received 6th April 1925.]

Some of the papers in this valuable report have already been noticed from an abridged source [*R.A.E.*, B, xii, 120]. In discussing the problems of malaria control on rubber estates in the Federated Malay States, Dr. S. C. Howard points out the various factors obstructing the progress of this work. Among the more important of these are the lack of knowledge among the planting community concerning the general principles of such work, and the lack of continuity in the work as a result of constant changes among the officers responsible. It is suggested that the planting community of each State be urged to combine and encourage the formation of an Anti-Malaria Bureau, the activities of which are outlined.

Other papers dealing with malaria are "Notes on the Control of Malaria in Sarawak," by V. A. Stookes, describing an attempt to control malaria on an oilfield where conditions as to labour and work differ, in many respects, from those prevailing elsewhere, the more important Anophelines present being *Anopheles umbrosus*, *A. hyrcanus* (*sinensis*) and *A. barbirostris*; and "Some Remarks on Malarial Epidemics caused by *A. hyrcanus* (*sinensis*)" by Dr. E. W. Walch [*cf. R.A.E.*, B, x, 38; xii, 80].

Wu Lien-Teh. **The Original Home of Plague.**—*Trans. 5th Bienn. Congress Singapore 1923, Far Eastern Assoc. Trop. Med.*, pp. 286–304, 1 map. London, 1924.

The geographical and historical evidence concerning the original home of plague is reviewed, this apparently being somewhere in Central Asia.

Walch (E. W.) & Keukenschrijver (N. C.). **On Pseudo-Typhus in Sumatra.**—*Trans. 5th Bienn. Congress Singapore 1923, Far Eastern Assoc. Trop. Med.*, pp. 583–643, 37 figs., 1 pl. London, 1924. [Received 6th April 1925.]

In the first part of this paper, by E. W. Walch, the larvae and nymphs of Trombiculid mites from Sumatra [*R.A.E.*, B, xi, 134; xii, 151] are described and illustrated. The second part of the paper, by both authors, is entitled "Some Notes on Epidemiology." An outbreak of pseudotyphus that occurred in 1922–23 is described, the observations proving *Trombicula deliensis* to be the chief carrier of the disease, though it may also be transmitted by *T. schüffneri*. The latter species, however, has not been found on animals and can apparently only transmit the virus from man to man. Observations on rats support the supposition that, as in Japan, these animals act as a reservoir of the virus.

Wu Lien-Teh. **Plague in Wild Rodents, including the latest Investigations into the Rôle played by the Tarabagan.**—*Trans. 5th Bienn. Congress Singapore 1923, Far Eastern Assoc. Trop. Med.*, pp. 305–340, 5 figs. London, 1924. [Received 6th April 1925.]

This work forms a critical survey of the problem of the relation of the marmot (*Arctomys bobac*) to plague in Transbaikalia and Mongolia. A résumé of the relationship of rodents in general to plague is given, with a list of those susceptible to either natural or experimental plague. Transmission experiments with ectoparasites have been noticed [see subsequent papers]. The transmission from animal to man may possibly result from eating the flesh of the rodent, inhaling the organisms, through an open wound or by means of the ectoparasites. The cases recorded as resulting from eating the flesh have usually been traced to earlier bubonic and septicaemic affections. There is one case on record of a dealer in marmot skins who had never been in the fields but yet developed the axillary form of the disease, which proved fatal. There are many records of infection acquired through wounds during skinning operations, and transmission through ectoparasites is also conceivable.

[Suknev (V. B.).] **Сукнев (В. Б.). Организация и результаты обследования Забайкальского эндемического очага чумы в 1923 году.** [Organisation and Results of Observations in the Transbaikal Endemic Plague Region in 1923.]—**Забайкальский Губернский Отдел Здравоохранения** [*Transbaikal Govt. Dept. Health Protect.*], 80 pp., 9 pls., 6 figs., 1 map. Chita, 1924. [Received 7th April 1925.]

This report on the anti-plague work carried out in Transbaikalia includes a detailed account of the life-history and habits of the marmot (*Arctomys bobac*), as well as observations on other small rodents connected with outbreaks of the disease. The only flea found on *A. bobac* was *Ceratophyllus silantievi*, Wagn. According to Zabolotni, these fleas do not play the same part as the rat fleas in the transmission of the disease, though they may bite man. Live fleas taken from dead infected *A. bobac* did not infect guineapigs, and injections of emulsions made from these fleas were also negative. In one case where the crushed flea contained fresh blood and plague bacilli were found under the microscope, subcutaneous injections produced the disease in the guineapig. Similar experiments with small ticks [*Rhipicephalus haemaphysaloides*, Sup. ?] found on these marmots were also negative. Attempts to produce the disease in guineapigs through the medium of active lice taken from diseased marmots failed, though an emulsion of these lice killed the guineapig. In no case could the disease be produced in the marmots or guineapigs through the agency of living fleas or lice. Though under certain combinations of circumstances, these fleas and lice may transmit plague to man, they cannot be considered of very great importance in the spread of the disease as the requisite conditions are of comparatively rare occurrence. It is, however, possible that these experiments cannot be considered decisive, as they are not sufficiently extensive.

Though *Arctomys bobac* has been considered the chief reservoir of plague in Transbaikalia, the importance of other small rodents in this connection is pointed out. The destruction of rodents and the disinfection of their skins are discussed.

Wu Lien-Teh, Chun (J. W. H.) & Pollitzer (R.). **Plague Transmission through the Ectoparasites of the Tarabagan.**—*Amer. Jl. Hyg.*, v, no. 2, pp. 196–201. Baltimore, Md., March 1925.

Some of the experiments described have been noticed in the preceding paper. In 1924 the authors succeeded in infecting a guineapig with plague by direct transmission through the agency of living fleas, *Ceratophyllus silantievi*, Wagner, taken from a diseased marmot (*Arctomys bobac*), thus proving that this flea is capable of spreading plague from one animal to another. The rôle of the louse that infests this rodent, which may possibly be *Haematopinus lyriocephalus*, Burm. or *Linognathoides spermophili*, Cummings, is uncertain. It is, however, evident that any control of the handling of these animals and the trade with their skins must include insecticidal measures.

A tick (*Rhipicephalus haemaphysaloides*, Sup. ?) found on the marmot could not be induced to bite man even after nearly three weeks' starvation. Though it may not spread plague actively, it adheres tenaciously to the dead bodies and skins of the animals and might serve as a passive spreader of infection.

Pemberton (C. E.). **The Rat Control Problem.**—*Rept. Comm. Expt. Sta. Hawaiian Sugar Planters' Assoc., 1924*, pp. 25–26. Honolulu, 1925.

Interesting results have attended the study of fleas on dogs and cats in relation to their possible importance as carriers of the rat or plague flea [*Xenopsylla*] in Hawaii. Nearly 3,000 fleas were collected from dogs and cats and identified. No rat flea was ever found on a dog or cat, and as these animals are frequently seen to catch rats and mice it is evident that any rat fleas that pass to them do not survive on them.

Jordan (K.). **Siphonaptera collected by Rear-Admiral H. Lynes in Darfur in 1920 to 1922.**—*Nov. Zool.*, xxxii, no. 1, p. 113. Tring, 30th April 1925.

Among the fleas collected in Darfur in 1920–22 was *Xenopsylla cheopis*, Roths., from *Rattus macrolepis* and other rodents.

Scott (J. W.). **The Experimental Transmission of Swamp Fever or Infectious Anaemia by Means of Secretions.**—*Wyoming Agric. Expt. Sta.*, Bull. 138, pp. 19–62, 11 pls., 3 figs. Laramie, Wyo., June 1924. [Received 29th April 1925.]

The results of previous experiments [*R.A.E.*, B, xi, 102] seemed to indicate that *Tabanus septentrionalis* more readily transmits swamp fever in horses than *Stomoxys calcitrans*. The Tabanids used in those experiments were collected in a field at least half a mile from any horses, but as an additional precaution were further tested to determine whether they harboured swamp fever at the time they were collected. They proved negative in this respect. It is believed that eye and nasal secretions play a part in the natural transmission of the disease. There appears to be no doubt that both secretions contain the virus, and that that from the eye is probably conducted into the nasal passages through the naso-lachrymal ducts. Or the virus may be excreted in both nasal and eye secretions. When the eye secretion is abundant

it may overflow at the inner angle of the eye, where it may be readily fed upon by house-flies [*Musca domestica*], which might then transfer it to the eyes of healthy horses. The nasal secretion has sometimes been so abundant that it collects in drops on the edge of the nostril, and flies have been observed feeding on this secretion. It would be easy for the virus present in these secretions to contaminate the food or drink of other horses, but infection by way of the alimentary canal is difficult experimentally and is not considered a probable method of natural transmission, and that described above by house-flies is considered much more probable. As a means of transmission, however, the house-fly probably plays a minor part, since the disease can be effectively transmitted by biting flies.

VAN THIEL (P. H.). **Over het voorkomen van de larve van** *Dermatobia hominis* **L. bij den jaguar.** [The Occurrence of the Larva of *D. hominis* in the Jaguar.]—*Herinneringsbundel uitgegeven ter gelegenheid der ingebruikneming van het Inst. voor Tropische Geneesk. te Leiden*, pp. 138–152, 1 pl. Leiden, 1924. (With Summaries in French, English and German.) [Received 23rd April 1925.]

In Surinam Bonne has found in the skin of a jaguar larvae of *Dermatobia* resembling those of *D. hominis*, Say, taken from the skin of a man in Rio de Janeiro. The variability of these larvae is discussed, and descriptions are given of various larval structures.

BRUMPT (E.). **Les Trypanosomes humaines.**—*Nouveau Traité Méd.*, i, pt. 5, pp. 339–384, 27 figs. [Paris, 1925.]

The two distinct kinds of trypanosomiasis, namely, the African forms (sleeping sickness), caused by *Trypanosoma gambiense* and *T. rhodesiense*, and the American form, or Chagas' disease, caused by *T.* (*Schizotrypanum*) *cruzi*, are described, and their history, geographical distribution, aetiology and method of transmission are discussed. These diseases are limited to the countries in which their vectors occur, and where it is sufficiently hot to allow of the development of the trypanosomes in invertebrates. The tsetse-flies occurring in Africa and acting as vectors of human trypanosomiasis are *Glossina palpalis*, R.-D., the usual vector of *T. gambiense*, which is also capable of transmitting *T. rhodesiense*, and may serve as a host for the development of *T. brucei* (*ugandae*), *T. cazalboui* (*vivax*), *T. dimorphon*, *T. pecaudi*, *T. congolense* (*pecorum*), *T. uniforme* and *T. nanum*, which are pathogenic to animals; *G. morsitans*, Westw., the vector of *T. rhodesiense*, which can also transmit *T. gambiense*, and many of the above-mentioned animal trypanosomes, together with *T. caprae* and *T. simiae*; and *G. swynnertoni*, Aust., the vector of *T. rhodesiense*, and probably of certain animal trypanosomes. The vectors of *T. cruzi* in America are the Reduviids, *Triatoma megista*, Burm., *Rhodnius prolixus*, Stål, *Eratyrus cuspidatus*, Stål, and others.

MACKIE (F. P.). **The Insect Menace.**—*Ind. Med. Gaz.*, lx, no. 4, pp. 172–178. Calcutta, April 1925.

The author lays stress upon the importance of insects in the transmission of disease, especially in tropical regions, and in estimating the

number of deaths caused by insects, classifies diseases broadly under those conveyed by insects alone and those in the transmission of which insects play a contributory part. The extreme antiquity of insects and the consequent perfection of their adaptability to environment, leading to the development of parasitic habits, are discussed. The more important insects are enumerated, and the specific infections concerned are briefly dealt with. The need for effective legislation regarding the problems of public health is emphasised, the unhealthiness of the tropics and sub-tropics being not merely a question of heat or humidity, but due almost entirely to the diseases fostered by these conditions.

Instruction pratique pour la lutte contre le paludisme.—*Bull. Soc. Path. exot.*, xviii, no. 3, pp. 227–230. Paris, 1925.

As a result of a request by the Minister for the Colonies for advice on anti-malarial prophylaxis, the members of a special Commission have compiled a list of recommendations, which are here quoted. They include destruction of breeding-places of mosquitos, as well as of the adults, and the administration of quinine, and point out the importance of a thorough knowledge of the particular vector concerned in any locality to be treated.

Bruni (N.). **Recherches sur quelques phytoparasites de nature protozoaire.**—*Bull. Soc. Path. exot.*, xviii, no. 3, pp. 251–256, 3 figs. Paris, 1925.

Attempts to propagate in *Euphorbia* spp. protozoa taken from *Acocanthera venenata* proved negative. Of a large number of *E. cyparissias* collected in France, only in two cases was *Herpetomonas* found. In these the flagellates were very numerous and distributed in various parts of the plant. A diluted form of the infected latex was inoculated into white mice, which succumbed after a few hours, but presumably merely as a result of the toxic properties of the latex, as normal diluted latex will kill guineapigs in 24 hours.

The Chrysomelid beetle, *Aphthona laevigata*, F., larvae of the Sphingid, *Deilephila euphorbiae*, L., and the Corizid bug, *Corizus capitatus*, F., were taken on the *Euphorbia* plants, but in no case were any flagellates found in the intestines of these insects.

Anderson (C.). **Note concernant les recherches pratiquées sur le latex de quelques Euphorbiacées de Tunisie.**—*Bull. Soc. Path. exot.*, xviii, no. 3, pp. 257–258. Paris, 1925.

A search for *Herpetomonas* (*Leptomonas*) *davidi* in the latex of various species of *Euphorbia* and in the Rhynchota found on them showed negative results.

Foley (H.) & Meslin (R.). **Exploration scientifique des Oasis du Gourara et du Touat (Mars-Avril 1913).**—*Arch. Inst. Pasteur Algérie*, ii, no. 3, pp. 263–302, 16 figs. Algiers, 1924. [Received 20th April 1925.]

The insect-borne diseases encountered in these Oases were trypanosomiasis of camels and horses, and malaria. The clinical aspect of the latter is discussed, the sole vector presumably being *Anopheles multicolor*, Camb. This mosquito breeds chiefly in very salt water contained

in animal hoof-marks and among reeds at the edge of a marsh, and has also been found in small numbers in stagnant pools together with *Theobaldia longiareolata*, Macq. No other Anophelines were found. Other Arthropods collected include *Argas persicus*, Oken, *Tabanus cordiger*, Mg., *T. rousselii*, Macq., *Cephalopsis titillator*, Clark, *Holoconops mediterraneus*, Kieff., and a louse, *Linognathus* (*Haematopinus*) *ovillus*, Neum., on wild sheep (*Ovis longipes*).

Raynaud (L.). **La peste en Algérie. Epidémies de peste dans la régence d'Alger. Cas de peste survenus dans la Colonie de 1899 à 1924.**—*Arch. Inst. Pasteur Algérie*, ii, no. 3, pp. 303–361, 8 figs. Algiers, 1924. [Received 20th April 1925.]

A review is given of the plague situation in Algeria, with an account of the rats occurring and the species of fleas found on them. Collections of fleas have shown that *Xenopsylla cheopis* (the most important plague carrier) is by far the most numerous, others, in the order of their occurrence, being *Leptopsylla* (*Ctenopsylla*) *musculi*, *Ceratophyllus fasciatus*, *Ctenocephalus canis* (*serraticeps*) and *Pulex irritans*. The commonest rat is *Mus norvegicus* (*decumanus*). The author suggests certain anti-plague measures, which might be laid before a conference for the purpose of applying them to the ports of the Far East and of the French Mediterranean, and by means of which he believes that plague could be completely exterminated within a short time.

Kieffer (J. J.). **Quelques nouveaux Chironomides piqueurs de l'Europe centrale.**—*Arch. Inst. Pasteur Algérie*, ii, no. 3, pp. 391–408, 9 figs. Algiers, 1924. [Received 20th April 1925.]

The new Chironomids described are *Forcipomyia decrescens*, *F. hirtipalpis*, *F. tenuisquama*, *F. bitensis*, *F. braueri* var. *punctatipennis*, n., *Atrichopogon miripalpis*, *A. fortiserra*, *A. serrulatus*, *A. winnertzi* var. *bidentatus*, n., *Kempia breviserra*, *K. appendiculata* var. *adjacens*, n., *Anakempia minima* and *A. sphagnicola*, all from Alsace-Lorraine, *Culicoides halophilus*, *C. salicola* and *C. salicola* var. *pictidorsum*, n., from Norway, and *Palpomyia variipilus*, from the Island of Rügen.

Comment recueillir les oeufs et les larves de moustiques.—*Arch. Inst. Pasteur Algérie*, ii, no. 3, pp. 421–422, 1 fig. Algiers, 1924. [Received 20th April 1925.]

Suitable apparatus is described for the collection of eggs and larvae of mosquitos.

Sergent (Ed.). **Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1923.**—*Arch. Inst. Pasteur Algérie*, ii, no. 3, pp. 423–442, 4 pls. Algiers, 1924. [Received 20th April 1925.]

The routine work carried out during 1923, including measures against malaria, is described.

Griffitts (T. H. D.). **Eight Weeks' Quinine Treatment for Malaria.**—*Pub. Health Repts.*, xl, no. 12, pp. 539–548. Washington, D.C., 20th March 1925.

In 1921, owing to the completion of a dam across a river in Dale County, Alabama, about 200 acres of land were covered with water.

No clearing or cleaning of the bed and banks of the reservoir had previously been carried out. Top minnows, *Gambusia affinis* and *Fundulus notti*, readily established themselves as a result of their previous existence in permanent small ponds in the area. All three forms of malaria are stated to have existed endemically in the district, but after the creation of the reservoir they became much more prevalent, *Anopheles quadrimaculatus* being the mosquito concerned. The removal of brush, logs, vegetation and floating matter round the shores of the reservoir and the application of Paris green at 10-day intervals from May to October effected a considerable reduction in the numbers of this mosquito during the season of 1923.

EIGENMANN (C. H.). **Yellow Fever and Fishes in Colombia.**—*Proc. Amer. Phil. Soc.*, lxiii, no. 3, pp. 236–238. Philadelphia, 1924.

In Peru the fish most effective in destroying mosquito larvae is *Pygidium piurae*, which is active at night. In Colombia a smaller species, *P. striatum*, is utilised, as well as *Piabucina panamensis*, which has an extremely wide distribution. A fish used on the Pacific slope is *Dormitator latifrons*, an allied species in Barranquilla and along the Atlantic slope generally being *D. maculatus*. The former has proved very effective, and there is every reason to believe that the latter will be equally so, if it is found in sufficient abundance. Another fish that is being tried in Colombia is *Geophagus steindachneri*. Two species of "catfishes," *Pimelodella chagrensis* and *Rhamdia sebae*, are also being used in Colombia. *Mollienisia caucana*, abundant in the swamps of the lower Magdalena basin, is a minute fish that for *a priori* reasons should be extremely useful. Species of the POECILIIDAE, to which family the genus *Mollienisia* belongs, and which contribute mosquito eradicators elsewhere, are widely distributed in Colombia. Along the coasts of the Guianas they are especially abundant both in species and numbers.

[MONTCHADSKI (A. S.).] **Мончадский (А. С.). Новые данные о строении и действии дыхательного аппарата у личинок Culicidae. (Предварительное Сообщение.)** [New Information on the Structure and Action of the Breathing Apparatus of the Larvae of Culicidae. (Preliminary Note.)]—**Труды Ленинградск. О-ва Естествоиспытателей** [*Proc. Leningrad Soc. Nat.*], liv, pt. 1, pp. 83–93, 5 figs. Leningrad, 1925. (With a Summary in German.)

The author has examined larvae of a number of different mosquitos and briefly discusses the structure and action of the breathing apparatus, with reference to the observations of previous workers.

DYAR (H. G.). **A New Sabethid from Panama (Diptera, Culicidae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 1–3, pp. 20–21. Washington, D.C., 15th April 1925.

Wyeomyia (*Technicomyia*, subgen. n.) *florestan*, sp. n., is described from the Panama Canal Zone; it is apparently allied to *W. hemisagnosta*, D. & K., of which it may possibly be the unknown male, though this mosquito has not been recorded from Panama.

DYAR (H. G.). **Some new Mosquitoes from Colombia.—III (Diptera, Culicidae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 1–3, pp. 21–24. Washington, D.C., 15th April 1925.

The species dealt with include *Culex* (*Choeroporpa*) *meroneus*, sp. n., which may be the same as *C. holoneus*, Dyar, from Costa Rica, *Taeniorhynchus* (*Mansonia*) *humeralis*, D. & K., the male of which is described for the first time, *Aëdes* (*Stegomyia*) *argenteus*, L., and *Anopheles tarsimaculatus*, Goeldi.

DYAR (H. G.). **Note on the Occurrence of Tropical American** *Mansonia* **(Diptera, Culicidiae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 1–3, pp. 24–25. Washington, D.C., 15th April 1925.

The author considers it probable that of the mosquitos belonging to the genus *Taeniorhynchus* (*Mansonia*), those of the subgenus *Mansonia* all breed in *Pistia*, whereas those of the subgenera *Rhynchotaenia* and *Coquillettidia* frequent the roots of the sedges that border still rivers. Larvae of *T.* (*M.*) *titillans*, Wlk., are recorded from the roots of *Pistia* in Panama, together with other larvae considered to be those of *T.* (*M.*) *humeralis*, D. & K. This species has not been recorded from Panama before, and the larva is described.

DYAR (H. G.). **Note on Bromelicolous** *Anopheles* **(Diptera, Culicidae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 1–3, pp. 25–27. Washington, D.C., 15th April 1925.

The opinion was formerly held that there was but one species of *Anopheles* breeding in Bromeliaceae, with local forms, but it is now thought that there are two species, *A. cruzi*, D. & K., from Peru and Brazil with race *neivai*, H., D. & K. (*hylephilus*, D. & K.), from Panama, Costa Rica, Surinam, etc., and *A. bellator*, D. & K., from Trinidad with race *bromelicola*, n., from Venezuela.

DYAR (H. G.). **Some Mosquitoes from Ecuador (Diptera, Culicidae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 1–3, pp. 27–31. Washington, D.C., 15th April 1925.

The species dealt with include *Aëdes metoecopus*, sp. n., resembling *A.* (*Finlaya*) *heteropus*, Dyar, from Costa Rica [*R.A.E.*, B, x, 55], *Anopheles tarsimaculatus*, Goeldi, *A. pseudopunctipennis*, Theo., *A. mediopunctatus*, Theo., and *A. cruzi*, D. & K.

BONNE-WEPSTER (J.) & BONNE (C.). **Note on the Predaceous Habits of the Larvae of** *Sabethoides bipartipes* **Dyar & Knab. (Diptera, Culicidae.)**—*Insecutor Inscitiae Menstruus*, xiii, no. 1–3, p. 32. Washington, D.C., 15th April 1925.

The larvae of *Sabethes* (*Sabethoides*) *bipartipes* are recorded as feeding on the small larvae of other mosquitos in the interior of Surinam, where the species is very common.

DYAR (H. G.). **The Subgenera of *Mansonia* Blanchard (Diptera, Culicidae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 1–3, pp. 40–43, 1 pl. Washington, D.C., 15th April 1925.

The author divides *Taeniorhynchus* (*Mansonia*) into the subgenera *Coquillettidia*, Dyar, *Rhynchotaenia*, Brèthes, *Mansonia*, Blanch., and *Mansonioides*, Theo. A key to these is given with a list of the species. *T.* (*Mansonioides*) *marquesensis*, sp. n., is described from Lorenço Marques, Portuguese East Africa.

BARZILAI-VIVALDI (G.) & KAUDERS (O.). **Die Impf-Malaria—experimentell durch Anophelen nicht übertragbar.** [Inoculated Malaria—not transmissible experimentally by *Anopheles*.]—*Wiener klin. Wochenschr.*, xxxvii, no. 41, pp. 1055–1057. Vienna, 9th October 1924.

These experiments were made in a clinic in Vienna where infections with malaria are used in the treatment of paralysis. Two strains of malaria were used, one of which had undergone 95 direct passages and the other 82. During this time the sexual forms had become less and less conspicuous. Tests were made to ascertain whether Anophelines kept under optimum conditions were capable of acquiring infection from a series of the malaria-inoculated patients and whether the mosquitos could transmit such infection to healthy persons. A batch of 120 *Anopheles maculipennis*, bred in the laboratory under conditions precluding malarial infection, were taken from Rome to Vienna, where they were induced to bite patients already inoculated with malaria. In no case was there any evidence that the mosquitos acquired infection ; no oocysts were found in the stomachs of numerous dissected specimens nor were any traced in the one specimen from which a perfect preparation of the salivary glands was obtained.

MÜHLENS (P.) & SFARČIĆ (A.). **Bericht über Malariaarbeiten in Dalmatien.** [Report on Malaria Work in Dalmatia.]—*Centralbl. Bakt. Paras. Infekt.*, Ite Abt., xciv, no. 6, pp. 326–376, 3 pls. Jena, 8th April 1925.

Some of the information given here has already been noticed from another source [*R.A.E.*, B, xiii, 82]. *Anopheles maculipennis* is the commonest species in houses, and *A. algeriensis* and *A. elutus* are found chiefly in animal-quarters. *A. algeriensis* was found only in the Narenta valley and in autumn. In autumn *A. elutus* was more numerous than *A. maculipennis*, but was not found at all in May. Examinations of *A. maculipennis* in July and October in dwellings showed only a small percentage to be infected with malaria. No infection was found in mosquitos from animal quarters. The greatest abundance of *A. maculipennis* occurred in June and July. It was less numerous in September, especially in dwellings, but in October was somewhat commoner indoors, though less ready to bite. In Dalmatia, hibernation seems to occur chiefly in stables and sheds, and also partly in houses, very seldom in cisterns. The proportion of males to females varied according to the time of year, being as 2 to 3 in stables and 1 to 3-4 in dwellings in May, 1 to 4-6 in June and July,

and 1 to 10-20 in September and October. All mosquitos reared from eggs and larvae were in the proportion of 1 male to 2-4 females. Individuals found in May were clearly nearly all the first generation from the hibernated adults. The second appeared at the end of June, and the third at the end of July, or August at the latest. The individuals found in September and October belonged either to this third generation or to a fourth one ; in many districts and in a dry summer there is no water left for the latter to be produced. The principal breeding-places were ditches or irrigation channels, and pools, including those in the dry high-plateau regions that serve for watering cattle. No Anopheline larvae were found in cisterns or domestic tanks.

A. bifurcatus, which breeds and hibernates in rain-water cisterns in Jerusalem, apparently does not do so in Dalmatia. Dr. Apfelbeck reported finding larvae of *A. bifurcatus* under ice in ditches in December 1922, and the authors found adults in stables in October 1922, but they failed to find larvae from May to July or September to October. Dr. Apfelbeck found larvae of *A. superpictus* in October 1922 at Sutorina on the Gulf of Cattaro, Montenegro, and this species probably also occurs in Dalmatia.

MARTINI (E.). **Ueber *Anopheles*-Zucht (mit einigen *Anopheles*-Beobachtungen.** [On the Breeding of *Anopheles* and some Observations on *Anopheles*.]—*Centralbl. Bakt. Paras. Infekt.*, Ite Abt., xciv, no. 7–8, pp. 452–460, 3 figs. Jena, 1st May 1925.

Three different types of breeding-cages for Anophelines are described and illustrated. Two are suitable for the eggs and larvae and for keeping the adults for a short period, while the third is designed for breeding several generations continuously. A layer of earth covered with growing grass, dishes of water containing aquatic vegetation such as *Lemna* and algae, a resting chamber for the adults, sufficient space for flight, and a considerable degree of warmth and moisture in the air are features to which are ascribed the success attained in rearing several generations of *Anopheles maculipennis*. Hibernated adults were placed in the cage in March, and by September ten times as many were present, although many individuals, including one large batch of larvae, had been removed from time to time. All circumstances point to the youngest larvae being the progeny of a second or even of a third generation, and not of the original hibernated females. In summer a large number of dwarf adults appeared, apparently owing to rapid development caused by the heat, and these were followed by others of normal size, which predominated early in October. The author believes that the amount of moisture in the air is a factor of more importance to mosquitos than light, and that Macgregor's success in Mauritius in inducing fertilisation in captive Anophelines [*R.A.E.*, B, xii, 115] was due to the presence of adequate moisture. In captivity such moisture must be produced artificially in Germany and in the still drier Mediterranean region. The larvae from eggs laid in a period of dry atmosphere risk desiccation, and it would therefore be an advantage to the species if the adults did not oviposit under these conditions, but aestivated without feeding or mating. A high degree of atmospheric humidity is likely to exert

a stimulus in the opposite direction. A notable exception to this, however, is *Aëdes argenteus* (*Stegomyia fasciata*).

Engorged mosquitos retired to the dark resting place of the cage and remained there quietly for some days, until ready for a new feed, when most of the females came out on to the grass and showed excitement if anyone approached the cage. Engorged females thus appear to display a negative phototropism, whereas if hungry they remain in places where, in nature, they are within reach of food. As captive Anophelines readily take the blood of rats, it is possible that in nature small rodents may supply them with food. It was observed that digestion was not completed in 6 days in September 1924, the temperature varying between 14° and 20° C. [57·2° and 68° F.]. It is not certain whether in the district around Hamburg an oviposition follows each blood-meal. The females seemed to bite weekly, and this would imply a couple of thousand eggs, which was not the case. The reduction in size of the individuals in summer proves that warmth is the decisive influence on the size, and that the small size is unconnected with a preference for man. Late first-stage larvae were seen at the end of October and late second-stage larvae on 20th November. They were few in number, and probably hatched from eggs delayed in development by being out of water. Thus it seems that even in warmth no eggs are laid after September. Furthermore, early in October there was less inclination to bite, although the warmth and moisture were maintained at a rather high level. At times only 10-30 per cent. of the females fed. This appears to show that physiological changes occur in an artificially warm atmosphere at the same date as in the open. Stragglers found in the open may be due to eggs being hatched in ditches, etc., through a higher water-level resulting from the autumn rains. This independence of warmth is exemplified by the fact that *A. maculipennis* in Italy adopts winter habits at the same date as in Bavaria. But it is negatived by another observation, in which Anophelines were introduced into a cage from time to time as caught. Here all larval stages of *A. maculipennis* occurred on 4th January 1925, together with some larvae of *A. bifurcatus*, so that there must have been repeated ovipositions. Further experiments are required as regards all these points.

Missiroli (A.). **I tubuli del Malpighi nell'***Anopheles claviger* **ibernante.** [The Malpighian Tubes in the hibernating *A. maculipennis*.]—*Ann. d'Igiene*, xxxv, no. 2, pp. 113–122, 1 chart, 2 figs. Rome, February 1925.

Roubaud has expressed the view that sterility in hibernating females of *Anopheles maculipennis* (*claviger*) is caused by over-accumulation of excretory matter, and he found in such females a marked hypertrophy of the Malpighian organs [*R.A.E.*, B, xi, 163]. The author points out that Roubaud treated the Malpighian tubes as excretory organs without investigating their physiology. This investigation is held by the author to be of capital importance. After briefly recording the opinions on this subject of various authorities from Malpighi onwards, the author details his work in Italy with thousands of *A. maculipennis* at various seasons with the object of ascertaining any connection that might exist between the functions of the digestive tract and those of the Malpighian tubes, as a result of which he considers that their

excretory function is closely connected with the mid-gut. Of over 1,000 mosquitos captured indoors in the cold season less than 1 per cent. contained blood in the stomach, and those that did so could not be kept alive at the surrounding temperature, 12°–14° C. [53·6°–57·2° F.], until the blood had been completely digested, some dying after nine days with the blood still undigested. Other individuals kept in the same surroundings but fed on sweetened water lived for long periods. At 10°–12° C. [50°–53·6° F.] the mosquitos usually did not bite but eagerly sucked sweetened water, and at this temperature their digestive function appears to cease as regards albuminoids. During hibernation the mid-gut is at rest and the water and sugary liquids, taken at that period, are found only in the crop, never in the stomach. This is confirmed by the occurrence in that organ of a saccharomyces, never found in the stomach. Thus the mid-gut and the crop have different functions and digest different foods.

The author's observations show that while temperature undoubtedly influences genetic activity, it is not the only factor, and that a factor, at present unknown, produces such activity in hibernating mosquitos.

The low temperature also affects other organs connected with the digestive tract. In winter the Malpighian tubes are larger than in summer and the cells are distended by a granular substance and occupy the entire lumen of each tube, the cells appearing to be in a state of rest. In summer generations digestion is rapid, and the Malpighian tubes have the appearance of organs in a state of great excretory activity. The products of excretion appear in the Malpighian channels soon after a blood-feed and disappear when the stomach is empty. Another fact that indicates the state of rest of the Malpighian tubes in winter results from an examination of the breathing apparatus of *A. maculipennis*. The prestigmatic chamber is fitted with a muscular valve regulating the flow of air to the tracheae. In winter this valve is closed. As, according to Roubaud, the function of the Malpighian tubes during hibernation would entail much work and products of oxidation, it is difficult to see why the supply of oxygen should be reduced in a hibernating individual. Furthermore, *A. maculipennis* captured in summer and made to fast for 6–7 days shows the same cellular changes as a hibernating individual. On being fed, the Malpighian tubes decrease in size and excretion becomes abundant. The conclusions reached are that intestinal activity is suspended during hibernation, that *A. maculipennis* then feeds eagerly on water or sugary liquids, that such foods are digested and absorbed in the crop, without reaching the mid-gut, that the Malpighian tubes function during digestive activity in *A. maculipennis*, but are at rest during hibernation, and that temperature is not the only factor determining the suspension of genetic activity in hibernation, the other factors (which Roubaud thought he had found) being still unknown.

Bass (C. C.). **The Relation of the Malaria-Carrier to Malaria Prevalence.**—*Proc. Internat. Conf. Health Probl. Trop. Amer., Kingston, Jamaica, July 22-August 1, 1924*, pp. 61–66. Boston, Mass., United Fruit Company, 1924. [Received 8th May 1925.]

The purpose of this paper is to emphasise the importance of the malaria-carrier as one of the essential and controlling factors in the spread and prevalence of the disease, and after numerous experiments,

it is reasonable to conclude that man is the only one to be considered. Any person infected with malaria may become an effective carrier and should be regarded as a potential source of infection to others.

ROOT (F. M.). **American Anopheline Mosquitoes, their Classification and their Relation to the Transmission of Malaria.**—*Proc. Internat. Conf. Health Probl. Trop. Amer., Kingston, Jamaica, July 22-August 1, 1924,* pp. 149–156. Boston, Mass., United Fruit Company, 1924. [Received 8th May 1925.]

This is a brief résumé of the classification of the American Anophelines, together with a summary of the relation of the different species to the transmission of malaria. A classified list of the species is given, as well as infection indices, with a list of the malaria-carrying species. It would appear that in North America two species of the *Anopheles* group, *A. quadrimaculatus* and *A. maculipennis*, are the principal carriers, those of the *Patagiamyia* group (*A. punctipennis, A. pseudopunctipennis, A. crucians*) playing a very subordinate part. In Central and South America, the principal carriers belong to the *Nyssorhynchus* group (*A. albimanus, A. argyritarsis, A. tarsimaculatus*), while species belonging to the groups of *Patagiamyia, Arribalzagia* and *Dendropaedium* have been less definitely incriminated.

In the discussion following this paper H. R. Carter stated that *A. crucians* was an efficient carrier, and almost the only species breeding in the rural tide-water section of Virginia. This area is decidedly malarious and for the most part uninhabited by white people.

The author pointed out the possibility of the existence of two strains of *A. crucians* [*R.A.E.*, B, xii, 181 ; xiii, 20], and suggested that investigations should be made to see whether it is not possible that the strain breeding in brackish water may be an efficient carrier of malaria, while the fresh water variety is not.

LEPRINCE (J. A.). **Can we get better *Anopheles*-control and more Malaria-control at less Cost ?**—*Proc. Internat. Conf. Health Probl. Trop. Amer., Kingston, Jamaica, July 22-August 1, 1924,* pp. 157–164. Boston, Mass., United Fruit Company, 1924. [Received 8th May 1925.]

The heavy financial cost incurred through loss of labour due to malaria is discussed, and attention is drawn to the folly of attempting the development of natural resources in malarial countries without taking proper precautions. The importance of effective screening and the use of mosquito traps is insisted on, and also the creation of artificial breeding-places where control measures can be practised. It is stated that it is frequently less costly to remove sufficient aquatic vegetation to make control by means of fish satisfactory than it is to apply larvicides, especially when far from a base of supplies. A combination of fish-control supplemented with a Paris-green dust-cloud treatment, is, in some instances, more economical than any other known measures. On some occasions the costs have been reduced by 60 per cent. by using top minnows, *Gambusia affinis*, as compared with 80 per cent. by using Paris green.

Carter (H. R.) & LePrince (J. A.). **Suggestions for the Control of Malaria on the Plantations of the United Fruit Company.**—*Proc. Internat. Conf. Health Probl. Trop. Amer., Kingston, Jamaica, July 22-August 1, 1924*, pp. 165–168. Boston, Mass., United Fruit Company, 1924. [Received 8th May 1925.]

These suggestions refer particularly to the control of malaria among the labourers employed by the United Fruit Company and living in quarters under its control. These are discussed under the following headings: —Prevention of Anopheline production in so far as this is economically practicable; the possibility of using repellents around the quarters of employees; the daily hand-killing of Anophelines in quarters; and freeing from infection those employees treated for malaria. The advisability of the control of any particular breeding-place should depend on the cost of its control and the amount of malaria it will produce if not controlled. Hand-killing of mosquitos, even if carried on in perpetuity, is a cheap method in proportion to its efficacy. The regular administration of quinine to healthy people to immunise them against the bites of infective Anophelines is not recommended, except in a temporary emergency.

Fülleborn (F.). **The Blinding Filaria of Guatemala** (*Onchocerca caecutiens*, **Brumpt, 1919**).—*Proc. Internat. Conf. Health Probl. Trop. Amer., Kingston, Jamaica, July 22-August 1, 1924*, pp. 241–256. Boston, Mass., United Fruit Company, 1924. [Received 8th May 1925.]

Onchocerca caecutiens, which occurs at an altitude of 2,000–6,000 ft. on the Pacific slopes of the volcanic ranges of Guatemala [*R.A.E.*, B, vii, 159, 160], appears to be identical with *O. volvulus* of West Africa, but the nodes containing the coiled parasites are nearly always located on the scalp, whereas *O. volvulus* is very rarely so found. Morphological differences between the two could not be established. The microfilariae of *O. caecutiens* were found in blood taken in the usual manner from the lobe of a patient's ear, and also in blood obtained from the veins, but it was proved that they accumulate in great quantities especially in the connective tissue of the skin, as in the case of *O. volvulus*. If *Onchocerca* is transmitted by Arthropods, it is probable that in the case of *O. caecutiens* the vector is one that feeds only during the daytime, possibly a species of *Simulium*.

Paterson (A. R.). **Notes on the Incidence of Plague in Kenya in Relation to a Recent Migration of Rodents, and on an Experiment in Eradication carried out by a Native Tribe.**—*Proc. Internat. Conf. Health Probl. Trop. Amer., Kingston, Jamaica, July 22-August 1, 1924*, pp. 591–612, 4 figs. Boston, Mass, United Fruit Company, 1924. [Received 8th May 1925.]

Details are given of the organisation of a rat campaign in Kenya. *Mus rattus*, which is never found apart from human habitations in the Colony, is the only species that has so far been found to be infected with plague.

Surcouf (J.) & Guyon (L.). **Recherches préliminaires sur la morphologie et la biologie des larves d'Oestrides. (1re note.)**—*Bull. Soc. ent. France*, 1925, no. 4, pp. 68–72, 3 figs. Paris, 1925.

The authors obtained 300 living larvae of *Oestrus intestinalis* (*Gastrophilus equi*), from a horse, and have made a study of their morphology and biology. Incidentally, cannibalism was observed among the larvae awaiting examination. The method of cannibalistic feeding is described; the attacking larva plunges its hooks into its victim behind the posterior stigmatic plate, thus coming into direct contact with an organ that occupies the whole of the apical region of the larva and gives it its coloration; this organ has been called the red organ, and details of it are given, the cells composing it being impregnated with haemoglobin and each attached to a trachea, which penetrates into its interior. The larvae, when living in the stomach of the horse, are periodically immersed in the food ingested by the host and in contact with the gastric juice. Oxygen is necessary to the larvae even during the periods when it cannot be obtained from the air in the stomach cavity of the host. The tracheal cells, impregnated as they are with haemoglobin, must form reservoirs of oxygen, which are filled at favourable moments and serve as a supply to the larvae when the stigmata are kept rigorously closed.

Walsh (G. B.). **Hippoboscidae in Yorkshire.**—*Naturalist*, no. 820, p. 141. London, May 1925.

The species recorded are *Ornithomyia avicularia*, L., on tawny owl and ring-dove, *O. lagopodis*, Sharp, on grouse, and *Lipoptena cervi*, L., on deer.

MacDougall (R. S.). **Insect and other Pests of 1923.**—*Trans. Highland & Agric. Soc. Scotland*, reprint, 42 pp., 38 figs. [Edinburgh] 1924. [Received 8th May 1925.]

The two ox warble-flies, *Hypoderma bovis*, DeG., and *H. lineatum*, Vill., are thought to have the same life-history. *H. bovis* oviposits singly on the hair, whereas the eggs of *H. lineatum* are laid in rows. The migrations of the larvae in the body of the host, the time of their occurrence, and the number of larval stages are discussed [*R.A.E.*, B, xii, 58, 183; xiii, 51].

The squeezing out of the last-stage larvae throughout the season is the best measure against these flies. Experiments with liquid dressings were carried out in the summer of 1923. One of these was prepared by mixing 1 lb. fresh lime in 1 gal. water, adding 4 lb. tobacco powder, mixing and allowing to stand for 24 hours, and then straining the liquid through muslin. No harm occurred to health or hide of the cattle treated. This dressing should be used soon after being prepared, as it deteriorates with keeping. Another dressing was a proprietary preparation of derris used in two strengths—1 oz. to a quart of water, and 1 oz. to a pint. With the former the percentage of larvae killed was 86, and with the latter 94. A third dressing tested on a small scale was a preparation of tetrachlorethane, which was moderately effective, especially in combination with nicotine.

Séguy (E.). **Sur un nouveau *Simulium* et synopsis des femelles des espèces du 2e groupe.**—*Bull. Soc. ent. France,* 1925, no. 6, pp. 107–109. Paris, 1925.

Simulium lesnei, sp. n., from the eastern Pyrenees, was taken at an altitude of over 5,000 ft. A key is given to the species of the second group of *Simulium* (species with the first tarsal joint not flattened or parallel-sided).

Noguchi (H.). **Action of certain Biological, Chemical, and Physical Agents upon Cultures of *Leishmania*; some Observations on Plant and Insect Herpetomonads.**—*Proc. Internat. Conf. Health Probl. Trop. Amer., Kingston, Jamaica, July 22-August 1, 1924,* pp. 455–479, 4 pls. Boston, Mass., United Fruit Company, 1924. [Received 8th May 1925.]

The relations of the different species of *Leishmania* are discussed, and their resistance to various agents is described. *L. infantum* is serologically identical with, or closely allied to, *L. donovani*, thus conforming with clinical observations, which indicate that the visceral leishmaniases (*L. donovani* and *L. infantum*) are distinct from oriental sore (*L. tropica*), which is merely a skin infection, and probably also from the American leishmaniasis (*L. brasiliensis*), which involves both skin and mucous membranes, and is often malignant.

The various skin ulcers of Brazil, particularly those of the Brazilian type of leishmaniasis, are said to be very common among persons who are engaged in clearing uncultivated woodlands, suggesting the possibility of the pathogenic *Leishmania* occurring in plants. Two varieties of *Euphorbia* from Kingston were examined with negative results. Among a number of plants obtained from Honduras, flagellates were found in a few cases in *Asclepias curassavica, Euphorbia pilulifera* and *E. brasiliensis*. Numerous nymphs and winged adults of the Lygaeid bug, *Oncopeltus cingulifer*, were found on the flowers and pods of *A. curassavica*, and herpetomonads were isolated from the intestines of the nymphs. One male and three females were placed on *A. curassavica* in a greenhouse (80° F.). Eggs were laid after 14 days, and hatched in 4 days. Only one nymph of those dissected 3 weeks after hatching revealed the herpetomonad; later, however, practically all were found to be infected. The plants on which the adults and nymphs had been feeding for over three months gradually lost most of the young leaves, but repeated examination of the leaves for the presence of flagellates in the latex proved negative. The morphology of the plant flagellates, and of the herpetomonad found in *O. cingulifer* is described. They could not be cultivated in the media suitable for *Leishmania*, but, owing to the extremely large numbers of the motile flagellates present, natural cultures were obtained in the latex. These were used for experiments to determine the action on them of immune serums of high titre produced by the immunisation of rabbits against the four strains of *Leishmania*. Neither the plant nor insect flagellates were influenced by any of these serums. It would, therefore, appear that the flagellates as they exist in the latex of *A. curassavica, A. syrica*, or *E. brasiliensis*, or in the intestine of *O. cingulifer* are immunologically distinct from *Leishmania*. These differences in reactions between the plant or insect flagellates and human *Leishmania* may be an expression of

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faculties acquired under highly specialised environments. It is also possible that there may exist, amongst these flagellates, certain strains that are immunologically and culturally identical with *Leishmania*, and are capable of producing the skin infection in man, either directly or after gradual adaptation through insects and lizards.

WIBAUT-ISEBREE MOENS (N. L.). **Soorten van wantsen in woningen.** [The Species of Bugs in Dwellings.]—*Ned. Tijdschr. Geneesk.*, lxix, 1st Half, no. 6, pp. 627–630. Amsterdam, 1925.

In June 1924 the sanitary service at Amsterdam was called on to disinfest a village dwelling overrun with bugs in spite of a previous fumigation with hydrocyanic acid by the "Zyklon" method. Examination showed that the insects were settled under the roof-tiles on the sunny side of the roof, and chiefly near the numerous starlings' nests there. Eggs abounded on the wood-work under the tiles. Careful examination showed that the species of bug concerned was *Cimex columbarius*, Jen., and it is suggested that the common occurrence of bugs in many houses in Amsterdam may be due to the pigeons that are kept in attics.

A table is given of the measurements of the bodies and of the 3rd and 4th antennal joints of *C. hirundinis*, Jen., *C. columbarius*, Jen., *C. lectularius*, L., and *C. vespertilionis*, Popp.

HIRST (S.). **Descriptions of new Acari, mainly parasitic on Rodents.**—*Proc. Zool. Soc. London*, 1925, pt. 1, pp. 49–69, 15 figs. London, April 1925.

The new species described are:—*Myonyssoides* (gen. n.) *capensis*, on *Cryptomys hottentotta* from Cape Colony; *Echinonyssus* (gen. n.) *nasutus*, on *Tupaia picta*; *Laelaps aethiopicus*, on rats from Kenya Colony; *L. algericus*, on *Mus algericus* from Algeria; *L. liberiensis*, on *Epimys defua* from Liberia; *L. oraniensis*, on field mice from Oran, Algeria; *L. lamborni*, on rats from Kenya Colony; and *L. grandis*, on rodents from Kenya and Uganda.

The new genus *Liponysella* is erected for *Liponyssus madagascariensis* [*R.A.E.*, B, x, 96], and a key is given to the African females of the species of *Laelaps* in the British Museum Collection.

Liponyssus bacoti, Hirst, and *Dermanyssus gallinae*, DeG., are recorded from South Africa as attacking man.

ALLEN (J. A.). **Auricular Scabies (Parasitic Otitis) in Silver Black Foxes.**—*Canad. Vet. Rec.*, v, no. 1, pp. 12–16, 2 figs., 1924. (Abstract in *Expt. Sta. Rec.*, lii, no. 3, p. 285. Washington, D.C., April 1925.)

Otodectes cynotis was first found in domesticated foxes in 1919, and since then serious outbreaks have occurred. In some cases these mites have been found in nearly 100 per cent. of the animals on certain ranches, and the affection seems to occur in cycles, being more frequent in some years than others. The symptoms as observed in dogs and foxes and a typical case are described, together with directions for treatment.

Harned (R. W.) & Allen (H. W.). **Controlling Bedbugs in Steam-heated Rooms.**— *Jl. Econ. Ent.*, xviii, no. 2, pp. 320–329, 2 figs. Geneva, N.Y., April 1925.

During the summer of 1924 experiments were conducted in the dormitories of the Agricultural and Mechanical College of Mississippi for the control of bedbugs, *Cimex lectularius*, L., by heat, and they proved so satisfactory that this method will, in future, replace fumigation with hydrocyanic acid gas. The rooms were heated by steam from a central heating plant, and the steam was maintained until inspection indicated that killing temperatures of sufficient duration had been secured. It was possible to make a rapid inspection at any time during the experiment without excessive discomfort, even in rooms with a temperature as high as 128° F. At temperatures of 120° F. and above, absolute control was secured by treatment of several hours' duration, and a very high percentage of mortality was secured by exposures to temperatures averaging 110° F. when maintained for 2 days or more. Nymphs and adults appear to be destroyed with equal readiness, and this seems to be true of eggs also. Bugs sheltered between thick mattresses survive much longer than those on beds or upon the floor. The labour outlay in killing bedbugs by superheating is much less than in fumigation or treatment with contact insecticides, and no expert manipulation is required. Normally it will be most effective when undertaken during hot, midsummer weather, when the outside temperature is sufficiently high for the heating plant to reach without difficulty an inside temperature of about 120° F. Unless the source of heat is considerably in excess of maximum requirements, it will not be feasible to make use of it during the winter months.

Hall (M. C.). **The Occurrence of Cuterebrid Larvae in Dogs and Cats, and the possible Modes of Infection.**— *Jl. Econ. Ent.*, xviii, no. 2, pp. 331–334. Geneva, N.Y., April 1925.

The larvae of flies of the genera *Cuterebra*, *Bogeria*, *Rogenhofera* and *Atrypoderma*, normally parasitic in rodents, occur more frequently in carnivora than is commonly supposed. Many cases of such larvae both in cats and dogs have been recorded. The manner in which the animals become infested is still problematical, but there is evidence in support of the idea that the usual subcutaneous infestation will follow the swallowing of young larvae. Rodents such as prairie dogs fed with the larvae obtained from the eggs of *Cuterebra tenebrosa*, Coq., became infested in the usual way [*R.A.E.*, B, vii, 128]. It has been noted that the eggs of *C. americana*, F., hatch spontaneously without such stimuli as moisture, friction or heat, and that the first stage larvae are extremely active. It appears probable that these larvae might be swallowed by host animals in licking themselves, and that the movements of the larvae on the skin would effect sufficient stimulation to cause licking of the involved areas. It has been suggested that dogs and cats become infested by eating rodents or rabbits containing young larvae ; and it is also possible that the flies occasionally oviposit on dogs and cats.

In the experiments with *C. tenebrosa* and prairie dogs, the larvae first appeared under the skin in 9–12 days after infection by the mouth ; the skin was punctured two days later, and the grubs emerged 37–47 days after infection. In a case recorded of subcutaneous infestation

of a puppy 3 weeks old by a larva, apparently of the genus *Bogeria*, evidence points to direct infection by the fly, as the possibility of it eating part of an infested carcase during the first week of its life is extremely remote. The possibility also of prenatal infection is considerable in the case of parasites with larvae having the habit of wandering through the host tissues. First-hand evidence that carnivora swallow Cuterebrid larvae in eating infested hosts has been obtained from Mississippi, where, in one case, a late-stage larva of a Cuterebrid was passed by a dog, and in another a third-stage larva had been collected from the stomach of a coyoté. In the case of a well-developed larva, presumably one that has undergone any degree of development under the skin, the grub probably passes, alive or dead, through the digestive tract without migration, and only very young larvae would be capable of again taking up their migration to the skin.

Frison (T. H.). **Intestinal Myiasis and the Common House-fly (*Musca domestica*, Linn.).**—*Jl. Econ. Ent.*, xviii, no. 2, pp. 334–336. Geneva, N.Y., April 1925.

A case of intestinal myiasis caused by the larvae of the house-fly, *Musca domestica*, L., was observed in Illinois in September 1924, in a boy slowly recovering from pneumonia. Larvae, less than half grown, were observed in the vomit, and the same day numbers were passed in the faeces.

Forsius (R.). **Ueber einen in Finland beobachteten Fall von Fanniasis (Myiasis) intestinalis.** [A Case of intestinal Myiasis observed in Finland.]—*Notulae ent.*, v, no. 2, pp. 50–53. Helsingfors, 8th May 1925.

This is a description of a case of intestinal myiasis in man due to the larvae of the Anthomyiid, *Fannia scalaris*, F.

Dusting (R. A.). **Stickfast Flea.**—*Jl. Dept. Agric. W. Australia*, ii (2nd ser.), no. 1, p. 35. Perth, March 1925.

Echidnophaga (*Sarcopsylla*) *gallinacea*, Westw., is still greatly in evidence and spreading to all districts where poultry are kept. The most successful method of control is to cement the floors of roosting houses and to have temporary shade that can be removed and destroyed. Roofs should be removed in early summer to allow the sun to penetrate into all parts of roosting quarters. Houses should be moved from eight to ten feet weekly, in such a manner that the sun may have full play on the vacated position. Any non-burning oil or grease may be used to kill the fleas on the heads of infested birds.

Newman (L. J.). **External Parasites of Sheep.**—*Jl. Dept. Agric. W. Australia*, ii (2nd ser.), no. 1, pp. 99–107, 11 figs. Perth, March 1925.

Trichodectes sphaerocephalus, Nitz., the red-headed sheep louse, and *Linognathus pedalis*, Osb., both infest sheep in Australia. The cumulative increase of lice is very rapid, especially upon animals in poor condition, and, in addition to the loss of weight and the ragged

texture of the wool, the depreciation of the fleece by staining, which arises from the excreta of the lice, is a very important point. *T. sphaerocephalus* does not suck blood from its host, but feeds on the epidermis and on the wool. It is commonly found near the skin on the upper parts of the neck, shoulders, back and thighs. The young reach sexual maturity in 16 to 18 days after hatching. The adult may lay 100 or more eggs.

L. pedalis has been discovered during the last year or two on sheep in several districts. It is found about the feet and undersides of the legs, and sucks the blood of its host. There does not appear to have been any previous record of it in Australia, but the author is of the opinion that the insect recorded as *L.* (*Haematopinus*) *ovillus*, Neum., in New South Wales [*R.A.E.*, B, xi, 124] is identical with *L. pedalis*.

The life-history of the Hippoboscid, *Melophagus ovinus*, L., is described in detail. The pupa is attached to the wool by a glue-like substance, and the adult fly emerges in from 20 to 25 days. The life-cycle is completed every 39 to 49 days. In treatment it is necessary to repeat dipping 20 to 25 days later in order to destroy any flies that may have emerged from pupae that resisted the first treatment.

McCallum (H.). **The Sheep Louse.**—*Jl. Dept. Agric. W. Australia*, ii (2nd Ser.), no. 1, pp. 108–111, 1 fig., 1 diagram. Perth, March 1925.

Owing to the ravages of external parasites, serious depreciation in the value of wool and carcases has taken place, and attention is drawn to the necessity for providing dips and other facilities for their eradication. Regular dipping is essential, and the process should not be hurried. Sheep should not be dipped during extremes of heat or cold, or when thirsty or in a heated state. A diagrammatic plan of an effective dipping tank is given.

Murray-Jones (F.). **Eradication of Lice and Tick in Sheep.**—*Jl. Dept. Agric. W. Australia*, ii (2nd Ser.), no. 1, pp. 112–113. Perth, March 1925.

In searching for parasites on sheep, special attention should be paid to the parts of the body between the chest and the forelegs, on the belly, beneath the jaw, and under the neck. The back and flanks should afterwards be examined. For ordinary dipping requirements the type of pen recommended in the previous paper should be adopted. The best time to dip sheep is one month after shearing for short wools, and six weeks for long wool varieties. Where, however, it is difficult to collect the sheep a second time, dipping immediately after shearing is the only alternative. When this is the case every care should be taken to see that the animals are effectively dipped—preferably in a swim dip. The only kind of dip recommended is one containing one-tenth per cent. of arsenious oxide. Lime and sulphur dips should be avoided in cases of scab, as lime has a detrimental effect upon the fleece, causing it to become hard and harsh in texture, stunted in growth, and a bad colour. Tobacco and carbolic and alkali dips are not recommended, as not only is the wool from sheep so dipped not suitable for making even ordinary fabrics, but it has been proved that they are absolutely useless.

Cornelius (—). **Ein neues Räudemittel.** [A new Specific against Mange.]—*Berliner tierärztl. Wochenschr.*, 1924, p. 614. (Abstract in *Deutsche tierärztl. Wochenschr.*, xxxiii, no. 21, p. 357. Hanover, 23rd May 1925.)

The author has treated sheep mange successfully with a proprietary preparation consisting of a watery solution of sulphur dioxide. About 53 fl. oz. of the preparation are needed for two applications to a newly shorn sheep freshly washed with soap and water. Neither the skin nor the health of the animals was affected.

Ferris (G. F.). **On Two Species of the Genus** *Halarachne* **(Acarina ; Gamasidae).**—*Parasitology*, xvii, no. 2, pp. 163–167, 2 figs. Cambridge, May 1925.

Of the various mites recorded from the nasal passages or bronchial tubes of seals and their relatives only three have been named. These are *Halarachne halichoeri*, Allman, from an Atlantic seal (*Halichoerus gryphus*) ; *H. americana*, Banks, from *Monarchus tropicalis*, another Atlantic species, and *H. otariae*, Steding, from *Otaria californica*. *H. otariae* is here recorded from the nasal passages of the California harbour seal (*Phoca richardi geronimensis*) from California and *H. mirounga*e, sp. n., from the nasal passages of the Guadeloupe Island elephant seal (*Mirounga angustirostris*).

Strickland (C.) & Roy (D. N.). **The Infection of** *Lucilia caesar* **with** *Herpetomonas*.—*Parasitology*, xvii, no. 2, pp. 168–169. Cambridge, May 1925.

The authors' conclusions from the experiments described are as follows :—Naturally infected flies do not infect their offspring through the ova. Larvae do not become infected by being brought in contact with ova or the site where oviposition has taken place. Larvae are easily infected when their food has been exposed to contamination by their parents. During metamorphosis from the larval to adult stage the infection is largely if not completely lost. Adults easily acquire *Herpetomonas* when exposed to infection, whether or no the larval stage had been infected. The parasite outside the insect becomes gradually less infective ; it survives at least 18 days and dies out within 33–34 days.

André (E.). **Sur un cas de myiase cutanée chez l'homme.**—*Parasitology*, xvii, no. 2, pp. 173–175, 3 figs. Cambridge, May 1925.

A larva of *Hypoderma bovis*, DeG., taken from behind the ear of a young girl from Upper Savoy, is described. The larva presumably gained entrance through a hair follicle and continued its development at the site of entrance. Among other cases of infestation of man by *H. bovis*, the author does not know of any instance of migration of the larva, such as occurs in cattle. This does not apply to myiasis in man caused by *H. lineatum*, Vill. Attention is called to the value of descriptions of early stage larvae of the species of *Hypoderma*.

Ghosh (E.). **On a New Ciliate,** *Balantidium knowlesii,* **sp. nov., a Coelomic Parasite in** *Culicoides peregrinus.*—*Parasitology,* xvii, no. 2, p. 189, 1 fig. Cambridge, May 1925.

Numerous individuals of *Balantidium knowlesii,* sp. n., several of which were undergoing ordinary transverse fission, were observed in the coelomic cavity of *Culicoides peregrinus* in Calcutta.

Kingsbury (A. N.). **On the Occurrence of** *Piroplasma* (*Babesia*) *canis* **in Malaya.**—*Parasitology,* xvii, no. 2, pp. 190–191. Cambridge, May 1925.

The occurrence of *Piroplasma canis* in dogs in Penang is discussed; the local invertebrate host is probably *Rhipicephalus sanguineus,* which has been found on dogs in Malaya.

Enderlein (G.). **Weitere Beiträge zur Kenntnis der Simuliiden und ihrer Verbreitung.** [A further Contribution to the Knowledge of Simuliidae and their Distribution.]—*Zool. Anz.,* lxii, no. 9–10, pp. 201–211. Leipzig, 5th April 1925.

This paper includes descriptions of the following Simuliids:—*Simulium* (*Prosimulium*) *nigripes,* sp. n., from Germany and Inverness; *S.* (*P.*) *pexifrons,* from South Carinthia; *S.* (*P.*) *tenuicalx,* from North America; *Taeniopterna,* gen. n., type *macropyga,* Lundstr.; *Hellichia latifrons,* gen. et sp. n., from Norway; *H. latimucro,* sp. n., from Savoy; *Gigantodax bolivianus,* gen. et sp. n., from Bolivia; *S.* (*Cnetha*) *taeniatifrons,* sp. n., from Illinois; *S.* (*Wilhelmia*) *mallochi,* sp. n. (*quadrivittatum,* Mall., nec Loew), from Costa Rica and Cuba; *Gynonychodon,* gen. n., type *nobilis,* de Meij., from Java; *Byssodon,* gen. n., type *forbesi,* Mall., from the United States; and *Simulium heringi,* sp. n., from Germany and Austria.

Swynnerton (C. F. M.). **An Experiment in Control of Tsetse-flies at Shinyanga, Tanganyika Territory.**—*Bull. Ent. Res.,* xv, pt. 4, pp. 313–337, 7 pls., 1 map. London, April 1925.

This very interesting account of tsetse-fly control work clearly demonstrates the great value of late grass-burning and settlement properly planned [*R.A.E.,* B, ix, 97; xi, 52]. The history and topography of the country are described, showing the gradual advance of the fly and retreat of the natives. During the last ten years this retreat would appear to have been at the rate of a mile a year; in some places it has been two miles a year since 1912. The distribution of the fly has apparently greatly changed, and according to some of the old inhabitants it disappeared completely in Nindo at the time of the great rinderpest, which occurred after the German occupation. The author's view, based on available information and the distribution of types of woodland, is that the fly present before the rinderpest was either *Glossina morsitans, G. pallidipes,* or both, these being found even now, and that the fly that was spreading southwards was *G. swynnertoni,* which may have lingered somewhere after the rinderpest or re-entered from Mwanza before the bush connection was finally cut.

The mere cutting of tsetse-infested bush is useless without consolidation of the clearing, and this has been effected by the introduction of native settlement, the special cutting down once or twice a year of

the new shoots for a few hundred yards around the villages, the keeping of goats, ploughing, which entails stumping, the digging up of stumps for firewood, and the killing of trees by poisons and ring-barking. Late grass fires lighted on a broad front with a good wind and followed up by the burners, produce, when the grass growth is sufficient, a "drive" of the flies on the wing; these then become congregated in enormous numbers beyond the limits of the fire and in any appreciable patches of ground that escape it. In these places they may be exterminated by the prompt use of nets and bird-lime. Of the pupae collected in the burnt area, 52 per cent. were definitely dead as compared with only 9 per cent. in areas that were not burned. The pupae were collected the day after the fire; had they been left out under the conditions of exposure produced by the fire, a larger proportion would probably have succumbed. The willing co-operation of the natives in such work is essential, and it is certain that with tact and good organisation they can be guided themselves gradually to push back, break up and demolish a tsetse belt. This is both the most practical way of dealing with the problem, and the way that best accords with the sound policy of educating the natives to understand and attack their own problems and advance themselves through their own efforts.

Methods of adapting work on these lines against the same type of fly in other parts of the Territory, where there is no segregation of man from fly and the natives live scattered through the infested bush, are suggested.

Brug (S. L.). **A New *Armigeres* (Diptera, Culicidae) from Ceram (Moluccas).**—*Bull. Ent. Res.*, xv, pt. 4, pp. 345–347, 2 figs. London, April 1925.

Armigeres denbesteni, sp. n., was found breeding in the ditches carrying refuse water from sago preparation in various villages in Ceram.

Macfie (J. W. S.). **A New Blood-sucking Midge from Singapore.**—*Bull. Ent. Res.*, xv, pt. 4, pp. 349–351, 1 fig. London, April 1925.

Haemophoructus maculipennis, gen. et sp. n., is described from Singapore, only the female being known, and *Culicoides inornatipennis*, C.I. & M., is recorded from the same locality.

Williams (C. B.). **The Seasonal Prevalence of Fleas in Egypt.**—*Bull. Ent. Res.*, xv, pt. 4, pp. 353–355, 2 charts. London, April 1925.

There is a definite annual rise and fall in the incidence of *Pulex irritans* in Cairo, the greatest abundance occurring about April. The fall in numbers occurs on the advent of hot weather (maximum over 30° C. [86° F.], mean over 22·5° C. [72·5° F.]). The relative mean temperature and mean humidity for the year are shown. While there is a slight increase in the number of fleas with the fall of temperature in the autumn, the great increase does not begin till after the cold weather in January. The maximum in spring occurs with a mean temperature of 15–19° C. [59–66·2° F.], but there is no corresponding maximum in November at about the same mean temperature. The humidity in November is, however, much higher than in April. The significance of this increase in the cool dry time of the year can only

be determined by a comparison with other localities. The possible relation of heavy winds to the abundance of fleas is suggested for comparison with future observations.

MacGregor (M. E.). **Mosquitos under Winter Conditions.**—*Bull. Ent. Res.*, xv, pt. 4, pp. 357–358. London, April 1925.

It is generally assumed that mosquitos pass the winter either as adults or in the larval stage. It is not, however, generally realised how many species simultaneously adopt both methods. Both adults and larvae of *Aëdes* (*Ochlerotatus*) *rusticus*, *A.* (*O.*) *nemorosus*, *A.* (*Finlaya*) *geniculatus*, *Anopheles plumbeus*, *Theobaldia annulata* and *T.* (*Culicella*) *morsitans* were collected in Surrey in January 1925. Under favourable conditions it is possible that even such species as *Culex pipiens* and *Anopheles bifurcatus* might withstand the winter in both stages. Unless, in any given locality, it can definitely be established that a particular species only passes the winter in the adult stage, the winter destruction of this stage would be fruitless. The special power of the larvae of hiding and entirely disappearing from their usual breeding-places under adverse conditions is discussed and must be remembered when searching for them in the winter.

Lamborn (W. A.). **The Seasonal Habit of the Common Anophelines of Nyasaland, with a Note on its Relation to the Seasonal Incidence of Malaria.**—*Bull. Ent. Res.*, xv, pt. 4, pp. 361–376, 1 chart. London, April 1925.

Generally speaking, the main factor determining the prevalence of insects would seem to be suitability of temperature, but in the tropics, where temperature variations may be slight, moisture is the controlling factor. Many insects that are aquatic during the larval stage have in the tropics a seasonal prevalence as definite as those that are wholly terrestrial, though the factors that determine their prevalence appear to be quite unknown. There is strong presumptive evidence that mosquitos are affected by seasonal prevalence, though precise information in respect of them as well as of other insects directly affecting man is lacking to a large extent. The present enquiry was carried out near the south end of Lake Nyasa at an elevation of about 1,560 ft., a district that is particularly favourable for mosquito study owing to the presence of an immense area of permanent water in a river, largely covered in the dry season with floating aquatic plants, especially *Pistia*. During the rains large numbers of temporary breeding-places are formed by the accumulation of water in hollows in the ground, most of which very soon dry up at the change of seasons, which are sharply marked into dry and wet. In the course of a year 11,829 mosquitos were collected; of these 68 per cent. were Anophelines, chiefly *Anopheles costalis*, Lw., and *A. funestus*, Giles, with a few *A. mauritianus*, Grp. The remainder were *Taeniorhynchus* (*Mansonioides*) with occasional species of *Aëdes* (*Stegomyia*) and *Culex*. The actual number of Anophelines taken in each month, and the figures of the monthly rainfall, show clearly the overwhelming abundance of *A. funestus* throughout the year, the comparative rarity of *A. costalis* during the dry months, and the marked increase in the numbers of this species when the rains are well established. Further confirmation of the seasonal incidence of *A. costalis* is furnished by observations in

other localities. The failure of previous workers to find this species in certain localities from which it is now recorded may be explained by the fact that their observations were made during the dry season. *A. costalis* is essentially a small-pool breeder, particularly favouring small collections of rainwater in natural hollows of the ground, etc., and may be found very occasionally in artificial places. The absence of larvae in permanent breeding-places in the dry season might be explained on the assumption either that the females do not oviposit or that the ova laid at the time do not hatch until the season is more favourable. In this connection the experimental evidence appears to be in direct conflict with the results obtained in the field, though the behaviour of an insect in captivity is not necessarily a sure guide to its conduct under natural conditions. Despite laboratory results, it seems probable that the absence of natural larvae in the dry season may be due to the inhibition of the ovipositing instinct in the Anopheline at such times as are unfavourable both to its mature and immature offspring. In insects the act of oviposition appears to be a reaction to suitable external stimuli. In the temperate zone an essential appears to be a mere rise of temperature to a suitable degree, but in many parts of the tropics this can hardly be the determining factor. It is suggested that the seasonal occurrence of *A. costalis* may ultimately be found to depend less absolutely on temperature than on a change in a complex of conditions (composition of water, algal content, etc.) which guides the choice of the insect in the final selection of a suitable breeding-place. If temperature alone is the factor, it is difficult to understand how, of two species, with apparently the same range, only one should be affected. There does not appear to be any definite optimum season for *A. funestus*, though there is a relative abundance of males during the late dry season.

Dr. W. Milne Tough has compiled, from hospital records (1911-1923), the data as to seasonal incidence of malaria in various localities in Nyasaland. Without exception there is a considerable rise in the malaria rate during the rains and a fall during the drier months. During 1923-24 this general rise was especially marked. From a review of records the seasonal prevalence of *A. costalis* in the district studied falls into a definite line with the seasonal incidence of malaria not only in Nyasaland, but in Kenya Colony, Uganda, Tanganyika Territory, Mauritius and Southern Rhodesia, and also in some of the West Coast Dependencies. Another factor that might influence the seasonal occurrence of malaria is the effect of temperature on the development of the sexual cycle passed by the malaria parasite within the mosquito. For the completion of this cycle a temperature of over 61° F. is required according to Dr. J. G. Thomson. Such a factor would hardly seem operative in this part of Nyasaland, for, apart from the absence of *A. costalis* during the season when a temperature so low for a tropical country may be reached, such cold is very transitory and may occur at intervals only during two or three months in the year.

A systematic dissection of a number of the two Anophelines was made. Of 430 *A. funestus*, 12 showed malaria infection, and of 121 *A. costalis*, 10 were infected. With 2 exceptions (both *funestus*) all contained zygotes ; the subject, however, requires further study. A preliminary list of the distribution of the two species in Nyasaland is given, and the necessity for a more extended mosquito survey is obvious. The author considers that a campaign directed more particularly against

A. costalis appears to be as necessary as that at present being conducted against *Glossina*, for it is certain that the less obtrusive insect levies an even heavier toll on life and health.

THEODOR (O.). **Observations on Palestinian** *Anopheles*.—*Bull. Ent. Res.*, xv, pt. 4, pp. 377–382, 3 figs. London, April 1925.

Prior to 1923 there is only one record (1918) of *Anopheles pharoensis* from Palestine, when it was thought to have been introduced from Egypt. It now appears to be abundant in Kantara during the autumn, and the finding of the larvae suggests that conditions may be suitable for its establishment. The eggs and larva are illustrated, and the pupa is discussed.

In December 1923 eggs of *A. elutus* were found to have air-floats similar to those of *A. maculipennis*. The phenomenon was at first thought to be due to the salinity of the water, but similar eggs were found in the Jordan valley, where no salt water was present. The floats appear in the autumn and decrease as the temperature rises, disappearing in the spring, which may indicate a relation to a temperature factor. It is considered that the character on which Buxton, in a recent paper [*R.A.E.*, B, xii, 85], separated the larva of *A. multicolor* from those of *A. superpictus* and *A. sergenti* cannot be maintained. The larva is on the whole extremely similar to that of *A. superpictus*, but there are differences in the head markings and palmate hairs.

A comparison of the pupae of all the species of the *Myzomyia* group suggests the difficulty, if not impossibility, of distinguishing them with certainty.

A description is given of the egg of *A. superpictus*.

CHRISTOPHERS (S. R.). **Provisional List and Reference Catalogue of the Anophelini.**—*Indian Med. Res. Memoir*, no. 3, 105 pp. Calcutta, December 1924. [Received 25th May 1925.]

In part i of this memoir a provisional list of Anophelines is given, with their geographical distribution and synonymy. Part ii contains keys to the subgenera and species. The author inclines to the recognition as genera of five distinct stems : *Anopheles*, which is world-wide ; *Nyssorhynchus*, which is purely neotropical ; *Myzomyia*, unknown in the New World ; *Chagasia*, represented by one species only in South America ; and *Bironella*, represented by one species from New Guinea.

[BEKLEMISHEV (V. N.).] **Беклемишев (В. Н.). Экология личинки *Anopheles maculipennis* и характер распространения этого вида в Пермском Прикамьи.** [Ecology of the Larvae of *A. maculipennis* and the local Distribution of the Species in Perm, Kama Region.]—**Извест. Биолог. Научно-Исслед. Института и Биолог. Станц. при Пермском Государств. Университете** [*Bull. Inst. Recherches biol. & Sta. biol. Univ. Perm*], iii, pt. 9, pp. 337–373, 1 graph. Perm, 1925. (With a Summary in English.)

The topography of the country, with particular reference to the distribution of water and the existence of *Anopheles maculipennis*, is described. This species is able to breed in water without any green vegetation, provided that it has a mineral bed and no appreciable amount of dead organic remains. The larvae were never found breeding in water containing any form of dead organic matter and devoid of

vegetation. The vegetation in this case is required for its chemical reaction on the water; in this connection plants that have their leaves above the water are useless and even harmful as they assist in the accumulation of dead remains. In two lots of water equally polluted the greater number of larvae are found in the one in which photosynthesis occurs with greater energy, *i.e.*, in the presence of the greater amount of submerged plants and of light. In the case of an equal degree of photosynthesis, the greater number of larvae are in the cleaner water. The larvae cannot live in very highly polluted water, even with an abundance of suitable vegetation and direct sunlight, though such conditions of extreme pollution are very rare. A water weed, *Spirogyra*, enables the larvae to live in water with a large amount of dissolved organic matter. Compared with the photosynthetic reaction of the plants, their presence as food for the larvae, as well as other reactions that occur, are considered of minor importance.

[Barbatenko (N. G.).] **Барбатенко (Н. Г.). Лесной малярийный комар в Прикамьи.** [The Forest Malaria Mosquito in the Kama Region.]—**Извест. Биолог. Научно-Исслед. Института и Биолог. Станц. при Пермском Государств. Университете** [*Bull. Inst. Recherches biol. & Sta. biol. Univ. Perm*], iii, pt. 9, pp. 375–378, 1 pl. Perm, 1925. (With a Summary in German.)

A comparison of larvae of *Anopheles bifurcatus*, L., from the Kama district with Martini's description of the Central European form shows only very slight differences; adult females, however, are different in colouration and size.

[Melnikov (N. I.).] **Мельников (Н. И.). Природные условия, способствующие развитию малярии в Красноуфимской лесостепи (Кунгурского окр.).** [Natural Factors favourable to the Development of Malaria in the Forest Steppe of Krasnoufimsk.]—**Извест. Биолог. Научно-Исслед. Института и Биолог. Станц. при Пермском Государств. Университете.** [*Bull. Inst. Recherches biol. & Sta. biol. Univ. Perm*], iii, pt. 9, pp. 379–387. Perm, 1925. (With a Summary in English.)

The following is taken largely from the author's summary: In the country under review malaria has spread rapidly during the last few years, one of the reasons being the close relation between human settlement and the presence of water suitable for the breeding of *Anopheles maculipennis*. The larvae are found in small clean pools and the larger ponds and lakes that have a rich submerged vegetation (*Ranunculus aquatilis*, etc.).

Schuurmans Stekhoven, Jr. (J. H.) & Schuurmans Stekhoven-Meyer (A. W.). **Een onderzoek naar de in Noord-Soemedang voorkomende anophelinen, haar larven en de verdeeling der soorten over de verschillende broedplaatsen.** [An Investigation of the Anophelines occurring in the District of North Soemedang, Java, and the Distribution of the Species in the various Breeding-places.]—*Geneesk. Tijdschr. Ned.-Indië*, lxii, no. 4, pp. 441–473, 1 pl. Batavia, 1922. [Received 28th May 1925.]

In order of abundance the larvae found were those of *Anopheles* (*Myzomyia*) *vagus*, Dön. (45·3 per cent.), *A.* (*Myzorhynchus*) *barbirostris*,

Wulp (29·7), *A.* (*Nyssorhynchus*) *fuliginosus*, Giles (14·9), *A.* (*M.*) *minimus aconitus*, Dön. (4·4), *A.* (*M.*) *minimus*, Theo. (1·8), *A.* (*M.*) ? *ludlowi*, Theo. (2·0), *A.* (*Cellia*) *kochi*, Dön. (1·7), and *A. hyrcanus*, Pall. (*M. sinensis*) (0·2). The scarcity of *A. hyrcanus* was possibly due to the season when the survey was made. The principal Anopheline breeding-places were fish-ponds and rice-fields, especially the former. *A. vagus* predominated in fish-ponds and *A. barbirostris* in rice-fields. Sunny ponds and those with a free water-surface yielded more larvae than ponds situated in shade, or with much surface vegetation. *A. minimus aconitus* occurred both in the ponds and in the fields. The characters of the larvae are discussed in detail and some individuals are described and figured.

Of the adult mosquitos collected in dwellings and animal quarters, the commonest were *A.* (*M.*) *subpictus*, Grassi (*rossi*, Giles) and *A. minimus aconitus*. There is a discrepancy between the great abundance of the adults of *A. minimus aconitus* indoors and the small number of its larvae. On the other hand, the larvae of *A. fuliginosus* were common, whereas not a single adult was captured indoors. The absence of *A. barbirostris* from dwellings confirms Swellengrebel's view that it is the one least adapted to man of all Dutch East Indian Anophelines. *A. ludlowi* does not appear to occur in this district; such larvae of the *ludlowi* type as were bred out gave rise to adults of *A. subpictus* (*rossi*). Some of the larvae of the *vagus* type also produced this species.

An unsuccessful attempt was made to distinguish between the males of *A. subpictus* and *A. vagus*.

Walch (E.). **Over** *Trombicula deliensis*, **n. sp., vermoedelijke overbrengster der Pseudotyphus, en andere Trombiculae van Deli. (Eerste Mededeeling.)** [On *T. deliensis*, sp. n., probably the Carrier of Pseudotyphus, and on other species of *Trombicula* from Deli.]—*Geneesk. Tijdschr. Ned.-Indië*, lxii, no. 5, pp. 530–570, 3 tables, 2 pls. Batavia, 1922. [Received 28th May 1925.]

This paper has already been noticed from an English version in another journal [*R.A.E.*, B, xi, 134].

Edwards (F. W.). **Diptera Nematocera from the Dutch East Indies.**—*Treubia*, vi, pt. 2, pp. 154–172. Batavia, February 1925.

The flies recorded include *Simulium varicorne*, sp. n., from Sumatra, and a mosquito, *Culex mimeticus*, Noé, from Java, being the first record of this species from that island.

Rodenwaldt (E.). **Entomologische notities III.**—*Geneesk. Tijdschr. Ned.-Indië*, lxv, no. 2, pp. 173–201, 1 table, 3 pls. Batavia, 1925.

A table gives the distribution of Anophelines recorded in the eastern portion of the Indian Archipelago during the past two years. *Anopheles parangensis* appears to be common in Celebes and in the adjacent islands; its possible importance as regards malaria requires careful study. A re-description of the female and descriptions of the male and larva are given.

It has been assumed that one and the same species is represented by all the Anophelines recorded as *A. ludlowi* from the Philippines,

Formosa, Indian Archipelago, Malacca and Andamans. The finding of *A. parangensis* (at first supposed to be *A. ludlowi*) in Celebes led to an investigation of its systematic position, in the course of which it appeared that Theobald had described as typical the examples from the Philippines and adjacent region, but that the form of *A. ludlowi* from the Sunda islands is distinct from the Philippine mosquito. The various characters on which this conclusion is based are detailed. The type specimens of Theobald were taken inland far from the sea, whereas the Sunda form is most common in brackish water swamps. The author therefore limits the name *A. ludlowi* to the form described by Theobald with a provisional distribution in the Philippines, Formosa and Moluccas (Ceram), and distinguishes under the name *A. ludlowi* var. *sundaica*, n., the examples from the Sunda islands, Malacca and its islands, and the Andamans.

A. ludlowi has been found in Timor, so that the former limit mentioned [*R.A.E.*, B, xii, 5] no longer obtains. *A. ludlowi* var. *sundaica* has not yet been definitely found in Celebes, and its place there is probably taken by *A.* (*Myzomyia*) *parangensis*. *A. subpictus* (*Myzomyia rossi*) must be an important malaria carrier there. *A. ludlowi* (typical form) has been found in Ceram, *i.e.*, in the centre of the area of *A.* (*Nyssorhynchus*) *punctulatus*, this single record being from a clear-flowing brook.

DAUDY (R.). **Etude épidémiologique et prophylactique de la malaria en Albanie.**—*Bull. Soc. Path. exot.*, xviii, no. 4, pp. 320–327, 2 figs. Paris, April 1925.

Anti-malarial measures should be comparatively easy at Tirana, in Albania, and would greatly improve conditions there, though the abundance of breeding-places and the importance and wide dispersal of the human carriers of the virus would entail some years of persevering efforts before success could be attained. The only adult mosquitos collected in the district were *Anopheles maculipennis*, Mg., while all those reared from larvae collected from different breeding-places proved to be *Anopheles* (*Pyretophorus*) *superpictus*, Grassi (*palestinensis*, Theo.).

ROUKHADZÉ (N.). **La parasitologie et l'épidémiologie du paludisme en Abkhasie (Géorgie).**—*Bull. Soc. Path. exot.*, xviii, no. 4, pp. 327–343, 2 graphs. Paris, April 1925.

Malaria occurs throughout the year in Abkhasia (Georgia), primary infections being observed for 4-5 months, while during the other 7-8 months relapses from earlier infections appear. Three distinct periods are noticeable: The epidemic period, during which the predominant types are *Plasmodium vivax* and *P. praecox*; the period of winter relapses, when *P. malariae* is predominant; and the period of spring relapses, when *P. vivax* is dominant. The epidemic period is from June to October. Not less than 50 per cent. of the cases are relapses.

Patients suffering from relapses frequently affirm that they have been bitten by mosquitos one or a few days previous to the onset of the attack. This is explainable by the fact that the injection into the blood of man of a sufficient quantity of heterogeneous albumin may cause the mobilisation and multiplication of sexual forms of the malaria parasite. The saliva of a mosquito may be the provocative

cause, the rapidity and certainty of appearance of the fever being in direct proportion to the number of bites received. In this respect, *Culex* spp. can act as the provocative agent as well as *Anopheles*.

In the coast districts of Abkhasia, the flight of *Anopheles* begins in the first half of March and hibernation towards the middle of November; in the mountain regions flight begins in early May and hibernation in mid-September. Anophelines seem to be present wherever human habitations are, the species being *A. maculipennis*, *A. bifurcatus* and *A. elutus*. Of these, *A. maculipennis* is the dominant species; *A. elutus* has as yet been found only at Soukhoum. *A. bifurcatus*, which occurs in smaller numbers wherever *A. maculipennis* is found, is frequently observed more or less engorged on the walls of houses and is apparently a malaria carrier. *A. maculipennis* passes through six generations in the maritime districts and three in the mountains; it hibernates chiefly in houses, and as soon as a room becomes warm it becomes active and bites. Hibernation of larvae has not been observed. In the maritime districts, *A. bifurcatus* breeds and completes development during the winter, the life-cycle requiring 50-60 days.

HOUDEMER (E.). **Parasites des animaux domestiques ou sauvages du Tonkin. (1ère liste.)**—*Bull. Soc. Path. exot.*, xviii, no. 4, pp. 343–350. Paris, April 1925.

A preliminary list is given of the parasites, including a few external ones, of domestic and wild animals in Tonkin.

MUZZARELLI (E.). **Sul passaggio di alcuni microrganismi patogeni attraverso lo intestino delle mosche carnarie.** [On the Passage of some pathogenic Micro-organisms through the Intestines of Flesh Flies.]—*Ann. d'Igiene*, xxxv, no. 3, pp. 219–227. Rome, March 1925. [Received 2nd June 1925.]

The author has investigated whether the pathogenic micro-organisms found on putrefying meat pass through the intestines of the larvae of flies feeding on it, retaining their pathogenicity, and whether they are found in the intestine of the adult and pass into the eggs. *Calliphora vomitoria*, *Sarcophaga carnaria* and *Lucilia caesar* were used, especially the first-named.

Pathogenic organisms occur in putrefying flesh and in the excreta of the larvae. Those found on the meat pass into the contents of the alimentary canals of the larvae. In the case of spore-less organisms their elimination occurs within a few days of ingestion; organisms with spores require a longer period. The normal microbic flora of the intestinal contents has no influence on the disappearance of pathogenic organisms from the intestinal canal. Organisms that are not pathogenic do not acquire pathogenicity in the intestinal canals of the larvae, and pathogenic organisms gradually lose their pathogenicity. The pathogenic organisms ingested by the larvae were not found in the pupae or in the intestinal canal of the adult.

Parasites of Sheep Maggot-flies.—*Jl. Dept. Agric. Union S. Africa*, x, no. 5, p. 380. Pretoria, May 1925.

Mormoniella (*Nasonia*) *brevicornis*, Ashm., appears to be widespread in South Africa, where it has been reared from *Chrysomyia albiceps*,

Wied., *Lucilia sericata*, Mg., and *Sarcophaga haemorrhoidalis*, F.; it will no doubt be found to attack the puparia of other blow-flies as well. A few individuals of the Chalcid, *Mesocomys pulchriceps*, Cam., have been reared; so far as could be ascertained they had parasitised the larvae of *Chrysomyia chloropyga*, Wied., which is the most troublesome species in South Africa.

Tsetse Fly and Nagane in Zululand.— *Jl. Dept. Agric. Union S. Africa*, x, no. 5, pp. 417–420. Pretoria, May 1925.

A synopsis is given of Mr. C. Fuller's conclusions as a result of observations made in Zululand in October 1924. The predominant tsetse-fly in Zululand is *Glossina pallidipes*, and it is likely to appear wherever the environment is suitable. In the absence of large game animals, it is constantly seeking for food and may travel long distances, though it is not inclined to attack man. The flies do not usually venture from the bush to a distance of 500 yards. *G. pallidipes* occurs in a definite phyto-geographical area in Zululand, the plant associations being of a xerophilus nature, as is also the fly, and its dispersion is equally inhibited by the same factor. Both *G. pallidipes* and trypanosomiasis would have spread further south had the fly not been inhibited by climatic factors. The eastern frontier of the fly-country is roughly parallel with the sea coast, 12 to 15 miles inland. This margin is mainly regulated by oceanic influences. The general distribution of the fly and its relation to topographical and climatic conditions show that its reported extensions in recent years cannot be confirmed, and there is no reason to believe that it exists farther south than it did 50 or 60 years ago. It follows that any occasional finding of this fly at points beyond its natural confines are traceable to accidental or chance dispersions. Such dispersion is, in the main, due to mechanical transport, and any spread into the coast bush would not be permanent.

Swynnerton (C. F. M.). **The Problem of the Tsetse Fly.**— *United Empire, Royal Colonial Institute Jl.*, xvi (N.S.), no. 5, pp. 275–284. London, May 1925.

An account of the tsetse-fly work recently carried out in Tanganyika Territory is given [*R.A.E.*, B, xiii, 105]. As regards the question of game, whereas certain animals may spread the fly by their movements into new and important areas, it is not thought that their wholesale destruction will exterminate it in a typical tsetse area. There are always districts beyond the field of operation from which the game will flow back, and even where game can be excluded there are the vast tracts in Africa that contain and shelter bush-pigs, which themselves appear to be capable of supporting the fly. Though it is doubtful whether the fly will, in the absence of game, subsist on small mammals, there are species of *Glossina* that have been shown to draw their sustenance in the main from reptiles. There is also evidence to suggest that when game is scarce the flies come in greater numbers to man. This may be a danger in areas where sleeping-sickness is present, as if the view that the game trypanosome and the human trypanosome are one is adopted, the destruction of game provides the very conditions under which the game trypanosome, normally harmless, is given the chance of adapting itself to man.

FISCHER (W.). **Die Schlafkrankheit auf Fernando Poo.** [Sleeping Sickness in Fernando Po.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, no. 6, pp. 255–264. Leipzig, 1st June 1925.

This is an account of sleeping-sickness in the island of Fernando Po and of curative treatment with " Bayer 205 " during the author's visit there in 1923-1924. *Glossina palpalis* occurs nearly everywhere, the shaded cacao plantations, which are intersected by numerous water courses, providing a suitable habitat.

NECHELES (H.). **Zur Sinnesphysiologie von** *Anopheles*. [A Contribution to the Knowledge of the Sense Physiology of *Anopheles*.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, no. 6, pp. 288–291. Leipzig, 1st June 1925.

The author has investigated the dependence of Anophelines on the humidity of the air in connection with the evaporation of moisture from their bodies, as the amount of evaporation must be enormous owing to the great extent of the surface of the body as compared with its volume. The direct effect of light on the habits of Anophelines seems to be much less than the influence of sunshine on atmospheric humidity, and it is believed that the latter is the important factor. In cellars in winter and ordinary rooms in summer, those parts with 75-85 per cent. of relative humidity seem to be preferred. As, therefore, there seems to be a fixed relation between relative humidity and the habits of Anophelines, the author suggests that the hair-like appendages of these mosquitos are organs that react to changes in atmospheric humidity and excite the nerve terminals.

SCHULZE (P.). **Endemisches Vorkommen einer mediterranen Zecke (*Dermacentor reticulatus* F.) in Deutschland.** [The Endemic Occurrence of a Mediterranean Tick, *D. reticulatus*, in Germany.]—*Zeitschr. Morph. u. Oekol. Tiere*, iii, no. 5, pp. 704–705. Berlin, 1925.

The author has identified as *Dermacentor reticulatus*, F., ticks taken from sheep in the valley of the Main.

DEL PONTE (E.). **Nota adicional sobre el género *Triatoma* Laporte con la descripción de 3 especes nuevas.** [An additional Note on the Genus *Triatoma*, with the Description of three new Species.]—*Rev. Inst. bact.*, iv, no. 1, pp. 23–34, 2 figs., 1 pl. Buenos Aires, March 1925. (With Summaries in French, English and German.)

It is suggested that the genus *Triatoma* originated in Oceania, whence migration occurred in two groups—one eastwards to America, the whole of which Continent has been invaded, and the other westwards, leaving colonies in India, Africa and the Azores. A key to all the species is given, including three new ones, *T. holmbergi*, *T. wernickei*, and *T. neivai*, all from South America.

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Petrochi (J.) & Zuccarini (J. A.). **Sobre la presencia del** *Plasmodium danilewskyi* **y de** *Haemoproteus* **sp. en la sangre de los gorriones** (*Passer domesticus*) **de Buenos Aires.** [The Presence of *P. danilewskyi* and *Haemoproteus* sp. in the Blood of the Sparrows of Buenos Aires.]—*Rev. Inst. bact.*, iv, no. 1, pp. 57–62, 1 fig., 1 pl. Buenos Aires, March 1925. (With Summaries in English, French and German.)

This paper has already been noticed from a French version [*R.A.E.*, B, xiii, 9].

Petrochi (J.). **Descripción de un nuevo** *Anopheles.* [Description of a new *Anopheles.*]—*Rev. Inst. bact.*, iv, no. 1, pp. 69–75, 5 figs. Buenos Aires, March 1925.

A full description is given of *Anopheles bachmanni*, sp. n., from Argentina, which the author recorded in a previous paper [*R.A.E.*, B, xii, 54] without describing it.

Henry (—) & Leblois (—). **Gale céphalique chez un perroquet.**—*Recueil Méd. vét. Alfort. Bull. & Mém. Soc. centr. Méd. vét.*, c, no. 4, pp. 87–91, 1 fig. Paris, 29th February 1924.

This case of psoroptic mange in a parrot caused by a mite that was apparently a variety of *Cnemidocoptes mutans* has been noticed from a less detailed account [*R.A.E.*, B, xiii, 71].

Henry (—) & Leblois ( ). **Crasse parasitaire de la poule.**—*Recueil Méd. vét. Alfort. Bull. & Mém. Soc. centr. Méd. vét.*, c, no. 4, pp. 91–93, 1 fig. Paris, 29th February 1924.

Observations are recorded of infestation of fowls by the Mallophaga, *Menopon pallidulum* and *M. pallidum*, the eggs forming a compact mass, generally at the base of the head feathers.

Sequeira (J. H.). **Parasitic Skin Diseases common to Man and Domestic Animals.**—*Brit. Med. Jl.*, no. 3363, pp. 1080–1081. London, 13th June 1925.

The most important of the mange mites that is likely to be transmitted from animals to man is *Sarcoptes scabiei*. Other genera are found in animals, but are peculiar to them, with the exception of the mange mite of the cat, *Notoedrus* (*Notoedres*) *cati*.

Demodex folliculorum is generally considered a harmless parasite of man, but it has been suggested that it may convey bacteria to the skin and be the cause of a form of " ring " impetigo. It appears to be much more pathogenic in domestic animals.

Charrier (H.). **Action des huiles et du pétrole sur les larves de moustiques.**—*C. R. Soc. Biol.*, xcii, no. 16, pp. 1280–1281. Paris, 15th May 1925.

There has been considerable difference of opinion regarding the method of action of oils on mosquito larvae, one view being that obstruction of the breathing apparatus is the cause of death and another that a toxic action is the cause. This is largely due to confusion

with regard to the oils used and the methods employed. The author has experimented with larvae of *Theobaldia longiareolata*, Macq., and has stained various oils before spreading them over the surface of water containing the larvae. It was found that, contrary to the usual opinion, mosquito larvae can breathe the oxygen dissolved in water and thus support for a certain time the absence of tracheal respiration. Olive oil and similar fatty substances (ethers or mixtures of ethers of glycerine) act by obstruction of the syphon and tracheal tubes, the larva dying in the same time as if it had been kept under water. Petroleum derivatives penetrate more or less quickly into the breathing apparatus according to their degree of viscosity. In the case of heavy, greasy oils, death is much more rapid than in the case of fatty substances properly speaking. The obstruction of the breathing tubes is here only of secondary importance, and the action is essentially toxic. With more volatile products it is toxic merely, and death may take place in a few minutes.

Ivanov (E.). **Les *Trypanosoma equiperdum* dans le corps des chenilles de *Galleria mellonella*.**—*C. R. Soc. Biol.*, xcii, no. 16, pp. 1286–1287. Paris, 15th May 1925.

Recent observations on larvae of *Galleria mellonella* infected with *Trypanosoma equiperdum* have shown that the blood of larvae that have been kept for 24 hours at a temperature of 37-39° C. [98·6-102·2° F.] is still infective to mice if injected in large quantities. In a mouse so infected trypanosomes were found on the 5th day, and death occurred on the 7th. A strain of trypanosomes kept at laboratory temperature was infective after 11 days in the blood of the larvae. On the other hand, the blood of larvae inoculated with *T. equiperdum* proved non-infective to mice when kept for 2-3 days at 37-39° C. or for 13-16 days at laboratory temperature. The trypanosomes that have passed through the larvae, if anything, increase in virulence. Contrary to Zotta's observations in the case of larvae of *G. mellonella* inoculated with *Herpetomonas* (*Leptomonas*) *pyrrhocoris* [*R.A.E.*, A, ix, 440], the larvae that have survived infection with *T. equiperdum* can complete development and give rise to adults capable of ovipositing. No immunity seems to be conferred on them, however. Microscopic examination of the blood during different periods of the struggle against infection (with the larvae at widely varying temperatures) showed that phagocytosis is the most active agent of defence of the organism, and that the most favourable conditions for this activity are realized at temperatures of 37–38° C. [98·6–100·4° F.].

Voinov (V. D.). **Le pigmentogénèse chez les larves de *Simulium*.**—*C. R. Soc. Biol.*, xcii, no. 18, pp. 1478–1480, 1 fig. Paris, 29th May 1925.

The development of the pigmentary cells in the larvae of *Simulium* is further discussed [*R.A.E.*, B, xii, 87].

Ormsby-Gore (Hon. W.), Church (A. G.) & Linfield (F. C.). **Tsetse Fly.**—*Rept. E. Africa Commiss.*, pp. 70–80. London, H.M.S.O., April 1925. Cmd. 2387, Price 3*s.* 6*d.* net.

Tsetse-flies (*Glossina* spp.) are the greatest menace to development in tropical Africa, inhibiting settlement in many parts of the country

and taking constant toll of human and animal life by means of the trypanosomes that they carry. This report briefly describes a survey of conditions in the East African territories during August-December, 1924. Knowledge regarding the conditions favourable to the fly and its increase are being rapidly accumulated. The question of game destruction is not considered likely to lead to success, but one of the most promising experiments is that of burning over large belts of scrub and then making a concerted attack on the fly [*R.A.E.*, B, xi, 53; xiii, 63, 105, 114, etc.]. It is suggested that every encouragement should be given to this work of extermination, and that the necessary funds should be forthcoming for its extension. Research work should be extended at the same time, especially laboratory work on the spot, and the possibility of international co-operation in dealing with the pest should be examined. It is suggested that a further commission of experts should be appointed to carry out a complete survey of the fly areas in tropical Africa, to carry on research, particularly with regard to the physical conditions influencing the numbers of fly, to experiment on a field scale with regard to extermination, and to study the treatment of both sleeping sickness and animal trypanosomiasis. Meanwhile, the several local governments should press forward the work of extermination, making local surveys and such scientific investigations as may be possible, arranging for co-operation between the various government services, and enlisting the assistance of the public, both European and native.

MYERS (J. G.). **The Cattle-tick** (*Haemaphysalis bispinosa*). **Investigations during 1923-24.**—*N.Z. Dept. Agric.*, Bull. 116, 105 pp., 17 figs. Wellington, N.Z., 1924. [Received 25th May 1925.]

A detailed account is given of the cattle-tick, *Haemaphysalis bispinosa*, as occurring in North Auckland, with notes on its bionomics, [*R.A.E.*, B, x, 114; xi, 197], seasonal cycle, host relationships, distribution, etc. It is practically the only tick infesting farm animals in New Zealand, and, although it has not been proved to carry bovine piroplasmosis, if tick fever should be introduced, there is a risk of this tick distributing it all over the country.

It has been found in New Zealand on 10 mammals and 7 birds. Cattle are the chief hosts, but horses and hares are severely infested, these last being sufficiently numerous to maintain a natural reservoir. Man is not attacked to any serious extent. Birds are not sufficiently infested to be of much importance as distributing agents. Sickness among stock does not seem to occur as a result of infestation, but there are indications of hides being damaged. Loss of condition has not been definitely traced to tick-bite without other contributing factors, but in view of the extreme irritation produced, especially in horses, it is bound to occur to some extent. Evidence rather indicates that destruction of ticks may appreciably increase the milk-yield of cows.

Dry heat and excessive moisture are both inimical to the tick. The chief natural enemies are birds, of which the most important is the English starling.

As it is of recent introduction and is chiefly a farm-animal parasite, *H. bispinosa* is at present practically confined to the *Paspalum* pastures of the settled areas. Dipping, spraying, hand-picking and dressing are all practised with some success. Prolonged immersion of infested animals in sea water is only moderately efficacious and is generally

difficult to carry out. The burning of herbage sheltering ticks is not very practicable, as *Paspalum* remains green till autumn and is very difficult to burn. Keeping the grass cropped close by pasturing and eliminating rushes would destroy much of the shelter for the ticks, but this is difficult to carry out in practice.

BEVAN (Ll. E. W.). **Inoculation of Cattle against Redwater and Gall-sickness.**—[*S. Rhodesia*] *Minist. Agric. and Lands*, Bull. 536, 8 pp. Salisbury, April 1925.

This is a revision of a bulletin previously noticed [*R.A.E.*, B, viii, 137.].

BEVAN (Ll. E. W.). **Report of the Director of Veterinary Research Southern Rhodesia for the Year 1924.**—Fol. 11 pp., Salisbury, Rhodesia, 1925.

In treating trypanosomiasis in cattle, the use of Bayer 205 has not been more satisfactory than that of a local preparation containing antimony and arsenic, which is infinitely cheaper, but it was found that the blood of animals after treatment with the former contained some specific elements which, if introduced into healthy animals, partially protected them for a limited period against massive infection by means of the syringe. It is thought that a similar condition might be set up in man and animals by serum therapy. Experiments to ascertain whether cattle by regular dipping and absorption of arsenic became harmful to tsetse flies as they do to ticks were inconclusive.

These flies [*Glossina morsitans*], when fed experimentally on rabbits, gave birth to numerous larvae, but not a single healthy adult developed. It is, therefore, thought possible that the blood of certain game is more favourable for the production of healthy offspring, and although the flies can exist on the blood of other species, the birth-rate may be reduced.

HERMS (W. B.). **Medical and Veterinary Entomology.**—2nd revd. edn., 8vo, xiv+462 pp., 229 figs. New York, The Macmillan Co., 1923. Price 28*s.* net. [Received 20th July 1925.]

The rapid growth of literature dealing with insects and related organisms, as affecting the public health and animal industry, has rendered necessary a thorough revision of the subject matter of the first edition of this work, which appeared in 1915 [*R.A.E.*, B, iv, 176]. The book retains the same general style and appearance, but a considerable amount of it has had to be re-written in order to keep it largely within its original limits. A historical account of the development of medical entomology has been added, and many of the chapters have been enriched by the experience of the author as an army sanitary officer during the late war. A number of the illustrations appearing in the original edition have been replaced by new ones.

SIMMONDS (H. W.). **House Fly Pest and Its Control in Fiji.**—*Agric. Circ. Dept. Agric. Fiji*, v, no. 2, pp. 85–86. Suva, 1925.

Illingworth has already pointed out the value of *Pheidole megacephala* in controlling *Musca domestica* [*R.A.E.*, A, v, 400], and there appears to be little doubt that these ants are the true cause of the small number of house-flies in Fiji.

Andrews (H. W.). **Flies and Disease.**—*Proc. S. London Ent. & Nat. Hist. Soc. 1924-25*, pp. 45–62. London, 1925.

This is a general account of Diptera in their rôles of internal and external parasites of man and animals, and as direct or indirect carriers of disease.

Cameron (J.). **Eradication of the Cockroach** (*Periplaneta* **sp.).**—*China Med. Jl.*, xxxix, no. 5, pp. 458–461. Shanghai, May 1925.

In experiments for the extermination of the cockroaches (*Periplaneta*), an efficient and economical powder has been prepared of a cheap commercial grade of finely powdered sodium fluoride 4 parts mixed with powdered boric acid 1 part. The powder should be sprinkled around the floor of the infested apartment, especially at the junction of the walls and floor, and allowed to remain for a fortnight, so that the adult cockroaches may carry small amounts of the powder into the crevices and cracks to their young.

Herms (W. B.). **A Case of Human Myiasis caused by the Ox-warble, *Hypoderma bovis*, DeG.**—*Jl. Parasitology*, xi, no. 3, pp. 149–150. Urbana, Ill., March 1925.

A case is recorded of infestation by *Hypoderma bovis*, DeG., in a man who had slept in the open in late July, 1924. Extensive migrations of the larvae in the tissues occurred, one emerging in October, 1924, from the right shoulder, and another on 3rd February, 1925, from the abdominal region.

Horton (F. F.). **Paralysis of the Oesophagus in the Horse due to "*Gastrophilus equi*."**—*Vet. Jl.*, lxxxi, no. 5, pp. 233–235. London, May 1925.

A mare that had been destroyed owing to paralysis of the pharynx and oesophagus was found to be infested in the lower third of the oesophagus with numerous larvae of *Oestrus intestinalis*, DeG. (*Gastrophilus equi*, Cl.), which were of varying sizes, many being embedded two-thirds under the mucosa.

Morgan (E.). **Maggots as an indirect cause of Joint-ill in Calves.**—*Vet. Jl.*, lxxxi, no. 5, pp. 243–247. London, May 1925.

Attention is called to the importance of examining newly-born calves daily for several weeks for the presence of fly larvae. In Venezuela, cows are apt to hide their newly-born calves in the long grass, and if not discovered and treated, they are almost certain to become infested with maggots in the umbilical region, causing the disease known as joint-ill. Antiseptic dressings, such as creolin or izal, applied to the umbilical region, as well as inside the mouth, around the lips and gums and in the anal region, will keep the animals free from infestation.

Chambers (F.). **Transmission of Sarcoptic Mange of the Dog to Man.**—*Vet. Jl.*, lxxxi, no. 5, pp. 251–252. London, May 1925.

A case is recorded of sarcoptic mange on the head of a man who had been in charge of a kennel of infected dogs. The infection was cured by applications of sulphur, creosote and oil.

Ewing (H. E.). U.S. Bur. Ent. **A new Chigger (*Trombicula* Larva) from Brazil.**—*Proc. Ent. Soc. Washington*, xxvii, no. 4, pp. 91–92. Washington, D.C., April 1925.

The larva of *Trombicula brasiliensis*, sp. n., is described from Manaos, Brazil.

Noguchi (H.). **Yellow Fever Research, 1918-1924 : A Summary.**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 10, pp. 185–193. London, 15th May 1925.

This is a review of recent studies on yellow fever, which seem to warrant the conclusion that *Leptospira icteroides* is the causal agent [*cf. R.A.E.*, B. viii, 78, etc.]. The importance of the anti-mosquito campaigns and prophylactic measures is pointed out.

Carter (H. F.). **The Anopheline Mosquitoes of Ceylon. Part i. The Differential Characters of the Adults and Larvae.**—*Ceylon Jl. Sci.*, Sec. D., Med. Sci., i, pt. 2, pp. 57–97, 7 pls., 11 figs. Colombo, 27th April 1925.

This paper, which is intended to be the first of a series, aims at providing a connected and not too technical account of the differential characters of Anophelines indigenous to Ceylon. The species dealt with are :—(subgenus *Anopheles*) *Anopheles aitkeni*, James ; *A. aitkeni* var. *insulaeflorum*, Swell. ; *A. annandalei*, Prashad ; *A. barbirostris*, Wulp ; *A. gigas*, Giles ; *A. hyrcanus*, Pall. (*sinensis*, Wied.) and *A. pseudobarbirostris*, Ludlow ; (subgenus *Myzomyia*) *A. culicifacies*, Giles ; *A. fuliginosus*, Giles ; *A. funestus* var. *listoni*, List., and var. *aconitus*, Dön. ; *A. jamesi*, Theo. ; *A. karwari*, James ; *A. leucosphyrus*, Dön. ; *A. maculatus*, Theo. ; *A. punctulatus* var. *tessellatus*, Theo. ; *A. subpictus*, Grassi (*rossi*, Giles), and *A. subpictus* var. *vagus*, Dön. A key is given to these two sub-genera, and synopses of the chief characters of the adults and of the mature larvae are included. Notes are added on the preservation and examination of Anophelines.

Sinton (J. A.). **Notes on Some Indian Species of the Genus *Phlebotomus*. Part xi. The Rôle of Insects of the Genus *Phlebotomus* as Carriers of Disease, with Special Reference to India.**—*Indian Jl. Med. Res.*, xii, no. 4, pp. 701–729. Calcutta, April 1925.

This paper deals with the sandfly problem as it applies to India, and suggests some lines along which it is thought useful investigations might be carried out. Of the specific diseases in India sandfly fever is known to be carried by *Phlebotomus*, cutaneous leishmaniasis (oriental sore) is almost certainly conveyed by this insect, and kala-azar is

suspected to be so. These three diseases are discussed, and previous work concerning them is reviewed. From the evidence at present available, only *P. papatasii* can be said to convey sandfly fever, and no other species has, as yet, been positively incriminated. A more accurate method for the diagnosis of the disease is needed as well as a more careful identification of the species of *Phlebotomus* used in transmission experiments.

Until a more accurate method of identifying the females is available only laboratory-bred specimens, identified by the examination of the males of the same brood, should be used.

The spirochaetal origin of the disease also requires confirmation. If the parasites are of this nature, it is possible that some of the arsenical compounds, like novo-arsenobillon, apart from their curative and tonic actions, might, if used at a very early stage of the disease, rid the peripheral blood of the patient of the virus, thus preventing the insect host becoming infected.

Of the various species accused of carrying the disease, *P. papatasii*, *P. minutus*, *P. major* and *P. sergenti* all occur in India, and another species, *P. perniciosus*, is very closely related to, if not identical with, *P. major*. With regard to oriental sore, though there is considerable evidence in favour of the theory that some species of *Phlebotomus* may be carriers, the work of the brothers Sergent and their collaborators [*R.A.E.*, B, x, 39, etc.] requires further confirmation. The correlation between the geographical distribution of *P. sergenti* and oriental sore suggests the possibility of this species being a carrier of the disease.

Epidemiological observations on kala-azar appear to fit most closely with the hypothesis that *Phlebotomus* may be the vector, and the distribution of *P. argentipes* suggests that this is the most likely species to be implicated in India [*cf. R.A.E.*, B, xiii, 30, 79].

Smith (R. O. A.). **A Note on a Simple Method of Breeding Sandflies.**—*Indian Jl. Med. Res.*, xii, no. 4, pp. 741–742, 2 pls. Calcutta, April 1925.

An apparatus is described which is particularly adapted for the breeding of *Phlebotomus argentipes*, and the problem of supplying suitable moisture conditions in the tubes used is discussed. The larval stage was found to last from 12 to 14 days, and the pupal stage usually from 5 to 10 days. A feeding cage made after the pattern of a mosquito feeding cage is also described.

Cunningham (J.) & Pundit (S. R.). **A New Endemic Focus of Kala-Azar in Southern India.**—*Indian Jl. Med. Res.*, xii, no. 4, pp. 743–753, 3 maps, 1 pl. Calcutta, April 1925.

As the evidence of endemic foci of kala-azar in the Madras Presidency, apart from Madras City, has so far been negative, the discovery of a definite focus in the extreme south of the Presidency is of particular interest. The infected area consists of a small town, Kayalpatnam, on the east coast in the Tinnevelly district, about 20 miles from the most southerly point of India. In this area infection is limited to the Mahomedan community alone, although the Hindus and Mahomedans

live in close proximity to one another. This is of importance as far as the carriage of the disease is concerned, as it almost certainly disposes of a wide-ranging insect as a possible carrier.

NAPIER (L. E.). **A Comparative Study of the Environment associated with Kala-azar Prevalence in Calcutta.**—*Indian Jl. Med. Res.*, xii, no. 4, pp. 755–769, 3 maps, 1 pl. Calcutta, April 1925.

In view of the remarkable difference, 121 against 4, in the number of cases of kala-azar from two different areas in Calcutta, they were investigated with regard to the general and sanitary condition of the houses and their surroundings and the living conditions of the population, and the results are discussed. As the insect survey is still in progress, only preliminary deductions are made, but there is ample evidence that some factor other than insanitary conditions favours the dissemination of kala-azar. Both areas contain excellent breeding grounds for bed-bugs. To the mosquito, conditions appear more favourable in the endemic than in the non-endemic area, but the definite association of the disease with ground-floor residence is more suggestive of an insect with a smaller range of flight. The association with vegetation, general insanitary conditions and ground-floor residence suggests that *Culicoides* may be involved. These midges usually breed in rotting vegetation. The sandfly [*Phlebotomus*] appears, however, to be the most likely vector. There are undoubtedly places favourable to *Phlebotomus* in the non-endemic area, but the almost complete absence of the disease from this area could be accounted for by the comparative rarity of these favourable conditions. Practically all the houses built of masonry have two or more storeys, and their occupants rarely sleep on the ground floor, so that the chances of a *Phlebotomus* becoming infected and passing the infection on would be very small indeed.

GILL (C. A.). **The Rôle of *A. rossii* as a Carrier of Malaria. "The *rossii* Problem"**—*Indian Jl. Med. Res.*, xii, no. 4, pp. 773–781. Calcutta, April 1925.

It is tentatively suggested that under certain experimental conditions *Anopheles subpictus*, Grassi (*rossi*, Giles), does not readily carry *Plasmodium falciparum*, but that the sexual cycle of *P. vivax* can under certain circumstances be readily completed in this mosquito. The work of many other investigators of the problem is quoted and discussed, and it is concluded that the real status of this mosquito in relation to the transmission of malaria is still an unsolved problem.

SINTON (J. A.). **Notes on some Indian Species of the Genus *Phlebotomus*. Part xii. *Phlebotomus argentipes* Annandale and Brunetti, 1908. Part xiii. Methods of Collection and Preservation.**—*Indian Jl. Med. Res.*, xii, no. 4, pp. 789–806, 1 pl. Calcutta, April 1925.

Phlebotomus argentipes (*annandalei*, Sinton [*R.A.E.*, B, xi, 50]) has not been recorded outside India and Ceylon, but it appears to be widely spread along the east coast of India at elevations below 1,500 ft. A detailed description is given. *P. marginatus*, Annandale, is considered identical with it.

The methods of collecting and preserving the flies of this genus are described.

Lloyd (R. B.), Napier (L. E.) & Smith (R. O. A.). **The "Blood Meal" of *Phlebotomus argentipes* identified by Precipitin Antisera.**—*Indian Jl. Med. Res.*, xii, no. 4, pp. 811–816, 1 pl. Calcutta, April 1925.

The conditions that characterise the endemic area of kala-azar in Calcutta [see above] are particularly favourable to sand-flies, which are present in much larger numbers in the endemic than in the non-endemic area. Though previous work [*R.A.E.*, B, xiii, 30] does not justify the assumption that the disease is transmitted by *Phlebotomus argentipes*, it is highly suggestive and appears to warrant provisional acceptance of this theory as a working hypothesis. *P. argentipes* occurs in the living rooms of most houses where the surrounding ground is manured by domestic birds or animals; where cows were kept, the midges tended to collect in the cowshed. It has been suggested that this species is capable of breeding wherever there is unprotected soil containing an admixture of nitrogenous matter; when cattle are not present and this matter is provided principally by poultry, *P. argentipes* turns to man for food; whereas if cattle are present it feeds on them in preference to man. In order to prove this theory, the blood meal was examined, and the convenient technique adopted is described. The results confirm the hypothesis obtained in the field with regard to the feeding of *P. argentipes*, and further show that this midge will seldom, if ever, stray from an occupied cowshed in search of food. The observations also strengthen the hypothesis that this species is the transmitter of kala-azar. As cattle have a distinctly protective influence, it is suggested that their presence in the neighbourhood of the dwellings of the poorer classes in Calcutta would probably be advantageous to the inhabitants.

Cleare (L. D.), Junr. **Report of the Biological Division.**—*Rept. British Guiana Dept. Sci. & Agric. 1923*, pp. 47–51. Georgetown, Demerara, 1925.

In household containers that were not receiving proper attention, large numbers of *Aëdes argenteus*, Poir., were found to be breeding, and numbers of *Culex fatigans*, Wied., were also breeding in a faulty tank. In late November and December, *A. taeniorhynchus*, Wied., was abundant along the coastlands and even in Georgetown itself. This species breeds in the marshy swamps of the coast and generally appears soon after the beginning of the rains. Extensive drainage of the breeding-grounds has proved a successful method of dealing with it. *Taeniorhynchus* (*Mansonia*) *titillans*, Wlk., occurs under similar conditions, but in much smaller numbers.

Marshall (J. F.). **Some Practical Notes on Mosquito Control.**—*Hayling Mosquito Control*, Circ. 16, 4 pp., 6 figs. [1925.]

Some of the information contained in this paper has already been dealt with [*R.A.E.*, B, xii, 132]. As a result of experiments with larvicides carried out at Hayling Island [*R.A.E.*, B, xi, 6] with soluble cresol, the author states that if a breeding-place has a surface area of A square yards and an average depth of *d* inches, the number of gallons

of larvicide that must be put in to attain any desired "strength" of 1 part in "n" parts is given by the formula :—$\frac{14 \times A \times d}{3 \times n}$. If the larvicide is used in a proportion of one part in 28,000, this formula reduces very simply to $\frac{A \times d}{6{,}000}$ gallons. Care should be taken to distribute the larvicide as uniformly as possible, either with a watering can with a rose nozzle or by casting successive instalments of the mixture out of an ordinary hand bowl. For comparing the cost of using a larvicide with that of oiling, if the thickness of an effective paraffin film is assumed to be 1/1,500 inch, then the cost of treating a piece of water of depth d inches with a larvicide that is c times as expensive as paraffin, and which has to be mixed with the infested water in a strength of 1 in n, is :—$\frac{1{,}500 \times c \times d}{n}$ times the cost of oiling the same piece of water. In the case of any larvicide for which c and n are known, it is easy to calculate the depth of water at which the cost of using paraffin and larvicide are the same. With soluble cresol, for example, the dilution recommended is 28,000 and the cost about four times that of paraffin. Insertion of these values in the above formula shows that the depth in question is $4\frac{2}{3}$ inches, and for any depth less than this, the larvicide is the more economical method of the two.

KIEFFER (J. J.). **Chironomides d'Egypte (Dipt.).**—*Bull. Soc. R. ent. d'Egypte,* xvii (1924), pp. 244–313, 24 figs. Cairo, 1925.

Notes are given on a collection of Chironomids from Egypt, with keys to the species of the various genera from Egypt and the British Sudan.

A large number of new species are described, including the following Ceratopogonines :—*Forcipomyia sate, F. hathor, F. armigera, Atrichopogon alfierii, A. osiris, A. aegyptius, A. isis, Apelma nilicola, Dasyhelea luteocincta, D. arenosa, Culicoides pilosipennis, C. nilotes, C. pharao, C. sciniphes, Thysanognathus nilogenes, Parrotia nilotica* and *Bezzia aegyptia.*

ENGEL (E. O.). **Some New South African Sarcophaga. (Dipt.).**—*Bull. Soc. R. ent. d'Egypte,* xvii (1924), pp. 314–342, 15 figs. Cairo, 1925.

The following new species of *Sarcophaga* are described :—*S. braunsi, S. flavibarbis, S. angelicae, S. erecta, S. maritima, S. booersiana.*

KIRKPATRICK (T. W.). **Preliminary Notes on the Determination of Egyptian Mosquitos, with Descriptions of three Species new to Science.**—*Bull. Soc. R. ent. d'Egypte,* xvii (1924), pp. 362–391, 15 figs. Cairo, 1925.

Keys are given to the adults and fourth stage larvae of mosquitos received from Egypt. Additions to a list published in 1919 [*R.A.E.*, B, viii, 34] are : *Anopheles* (*Myzomyia*) *rhodesiensis,* Theo., *A.* (*N.*) *sergenti,* Theo., *Culex tritaeniorhynchus,* Giles, *C.* (*Lasiosiphon*) *pluvialis,* sub. gen. et sp. n., *C.* (*Neoculex*) *deserticola,* sp. n., and *C. sinaiticus,* sp. n.

Séguy (E.). **Description d'un nouveau *Simulium* et synopsis des espèces méditerranéennes (Dipt. Simul.).**—*Eos*, i, no. 2, pp. 231–238. Madrid, 25th June 1925.

A key is given to the Mediterranean species of Simuliidae, the classification adopted being that used by Edwards. *Simulium ariasi*, sp. n., is described from Spain.

Seddon (H. R.). **Diagnostic and Investigational Work. Veterinary Research Report, no. 1.**—*Dept. Agric., N.S.W.*, Science Bull. 24. pp. 6–11. Sydney, N.S.W., April 1925.

Among the parasites recorded during 1923-24 were *Sarcoptes scabiei* var. *cameli*, *Haematopinus eurysternus*, *Oestrus* (*Gastrophilus*) *intestinalis*, and *Hypoderma lineatum*, collected from an imported animal in quarantine.

Two samples of an oily dressing supplied for treatment of sheep maggots were submitted owing to the use of the preparation having been attended with fatal results to the sheep. Chemical examination showed that the dressings consisted of a mixture of castor oil, kerosene, alcohol, nettlebore, etc. Tested in sheep, it was found that whereas the mixture was harmless when applied to the unbroken skin, a fatal dose might be acquired by means of absorption of a very small quantity through a surface abrasion.

Botsford (R. C.). **Mosquito Control Work in Connecticut. Season of 1924.**—*Connecticut Agric. Expt. Sta.*, Bull. 265, pp. 331–335. New Haven, Conn., March 1925.

The general conditions during 1923 are described, and a brief account is given of the measures taken in various towns.

Dyar (H. G.) & Shannon (R. C.). **A new Sabethid Mosquito from Panama (Diptera, Culicidae).**—*Jl. Wash. Acad. Sci.*, xv, no. 11, p. 234. Baltimore, Md., 4th June 1925.

Prosopolepis hemisiris, sp. n., is described from Panama.

Ewing (H. E.). U.S. Bur. Ent. **A Contribution to our Knowledge of the Taxonomy of Chiggers, including the Descriptions of a new Genus, six new Species and a new Variety.**—*Amer. Jl. Trop. Med.*, v, no. 3, pp. 251–265, 4 figs. Baltimore, Md., May 1925.

Knowledge of the Trombidiid mites in America is rather limited. The author is of opinion that *Leptus irritans*, Riley, and *Trombicula tlalzahuatl*, Murray, are identical, and as the former has priority, the name should stand as *Trombicula irritans*, Riley. The complete synonymy of this species is summarised. Other species dealt with include *Trombicula dentata*, sp. n., from Texas, on a white-tailed deer and on a cotton rat; *T. irritans* var. *tropica*, n., from Venezuela on a lizard; *T. panamensis*, sp. n., from Panama, on the cotton rat (*Sigmodon*); *T. insularis*, sp. n., from Santo Domingo, on a lizard; *Schöngastia sciuricola*, sp. n., from Montana on a squirrel; *S. californica*, sp. n., from California on a ground squirrel; and *Hoplothrombium quinquescutatum*, gen. et sp. n., from Hudson Bay, found adhering to a beetle mite taken from the stomach of a toad. Keys are given to the larvae of the American species.

Ronna (E.). **Apontamentos de Microfauna Rio-Grandense. IV. Serie—Suctoria (Pulgas). V. Dipteros.** [Notes on the Microfauna of Rio Grande do Sul. IV. Fleas. V. Diptera.]—*Egatea*, ix, nos. 2–3, pp. 142–143, 267–269. Porto Alegre, March-April & May-June 1924. [Received 26th June 1925.]

Brief notes are given on the following fleas :—*Xenopsylla cheopis*, Roth , common on rats ; *Pulex vespertilionis*, Dugés, found on all bats examined ; *Ctenocephalus canis*, Dugés, the common cat and dog flea ; and *Tunga* (*Dermatophilus*) *penetrans*, L. (chigger).

The mosquitos include *Anopheles* (*Cellia*) *albimanus*, Wied., *A.* (*C.*) *argyritarsis*, R.D., *A.* (*C.*) *brasiliensis*, Wied., *Aëdes* (*Culex*) *albofasciatus*, Macq., and *A. argenteus*, Poir. (*Stegomyia calopus*, Mg.).

Dobreitzer (I. A.). **Le Paludisme en Russie des Soviets.**—*Commissariat Santé pub.*, 81 pp., 3 maps, 8 figs. Moscow, 1924. [Received 22nd May 1925.]

The situation in Russia with regard to malaria as existing before the War is briefly reviewed, seasons of famine and poor harvests being invariably followed by outbreaks of the disease. The great increase in malaria during 1921–22 was largely due to migrations of the population and the troops during the War and to increasingly bad sanitary conditions. In 1923 malaria reached its maximum, appearing in regions hitherto exempt, such as the northern provinces. It was worst in the lower Volga districts, while in the north, particularly in the Province of Archangel, the increase was enormous. The seasonal curve of malaria incidence has somewhat changed during recent years. In 1912–13 the maximum occurrence was in spring and summer, reaching its highest point in May. In 1922 the chief outbreak was autumnal (August–October), reaching its maximum in September ; in 1923 the spring–summer epidemic was again the worst, with its maximum in June. These changes are fairly general throughout the provinces. It has been noticed that an autumn epidemic is generally followed by a high degree of malaria in the following year ; in 1923 the autumn epidemic did not occur in most of the provinces, which was a favourable sign for 1924. The correlation of the different types of malaria has also undergone a change ; malignant tertian, which was very limited in occurrence before the War, has spread over large areas. Benign tertian is essentially the spring form, appearing in April and May and rarely in June ; malignant tertian generally appears in August, seldom later. In 1923, the latter constituted sometimes as much as 90 per cent. of the total in the autumn months. Anophelines were found in 1923 even in the extreme north and at high altitudes. In European Russia they usually appear in the first half of May, in the Lower Volga in April and in the Caucasus in March or April. They disappear in October or November, but in houses they remain active, even in European Russia, in March and in December. It is estimated that 112½ million working days were lost through malaria in 1923, and that 60,000 people died from it. A general plan of campaign against the disease is outlined.

Wu Lien Teh. **A Further Note on Natural and Experimental Plague in Tarbagans.**—*Jl. Hyg.*, xxii, no. 3, pp. 329–334. Cambridge, March 1924.

In previous experiments in the inoculation of the tarbagan (*Arctomys bobac*) with plague, while in the hibernating state, it was found that the

infection ran an unusually prolonged course before death ensued. The principal ectoparasites of this rodent include the flea, *Ceratophyllus silantievi*, Wagn., lice (*Polyplax* sp.) and ticks (*Rhipicephalus* sp.).

It was proved experimentally that *C. silantievi*, when hungry, feeds readily on man, and is able to imbibe human blood.

Occasional observations suggest that the flea-average in spring is small, when compared with that in the autumn, and this is significant, as human plague is generally reported from Siberia towards the end of summer or in the autumn, during the season for hunting the tarbagan and during the harvest, when human beings come into contact with this animal. The possible modes of conveyance of the plague bacillus from the tarbagan to man have already been noticed [*R.A.E.*, B, xiii, 85].

PETRIE (G. F.). **A Commentary on Recent Plague Investigations in Transbaikalia and Southern Russia.**— *Jl. Hyg.* xxii, no. 4, pp. 397–401. Cambridge, 1924.

Previous work on the subject is briefly reviewed, and a list of references to the literature is given. It is evident that bubonic and pneumonic plague in Transbaikalia and the adjoining regions are traceable to epizootic plague in tarbagans. The first human cases in the tarbagan-infected districts are almost invariably met with in the late summer and autumn. Rats (*Mus norvegicus*) do not frequent many houses in Cossack villages ; they do not come into close contact with the tarbagan and play no part at all in the origin of human plague in Transbaikalia. Although other steppe rodents are more or less susceptible to plague, a natural infection has not been discovered in them. Epidemics amongst human beings have almost always been preceded by an epizootic outbreak amongst tarbagans. Young tarbagans harbour considerable numbers of fleas, the favourite situation of the parasite being the fur of the neck, and the fact that cervical buboes are commoner than axillary and inguinal ones gives support to the belief that flea transmission is the normal mode of infection amongst these rodents. In the human cases of bubonic plague in Transbaikalia axillary buboes are seen nearly as often as inguinal ones ; this proportion is higher than that found in plague derived from rats, and is comparable with the preponderance of axillary buboes in cases infected from the ground-squirrel in California, an animal that, like the tarbagan, is hunted and used as food. The circumstance that tarbagans constitute a natural reservoir of the infection is paralleled by observations made in widely scattered localities where epizootic plague in a variety of field rodents has given rise to outbreaks of bubonic and pneumonic plague in man (California, Orange Free State, Suffolk, Persia and Southern Russia).

BACOT (A. W.) & MARTIN (C. J.). **The Respective Influences of Temperature and Moisture upon the Survival of the Rat Flea (*Xenopsylla cheopis*) away from its Host.**— *Jl. Hyg.*, xxiii, no. 1, pp. 98–105, 3 figs. Cambridge, September 1924.

The object of the experiments here described was to ascertain the separate influences of temperature and drought upon the longevity of adults of *Xenopsylla cheopis*, Roths., in the absence of a host.

Considerable saturation deficiency exerts an adverse influence at almost every stage of the life history of the insect [*R.A.E.*, B, ii, 63], and the consequent diminution in flea-population no doubt plays a large part in modifying the spread of plague.

The authors' conclusions are as follows :—The survival of fleas (*X. cheopis*) apart from their host is approximately in inverse proportion to the saturation deficiency of the air, provided the temperature and air movements are constant, or in other words, to the rate at which they lose water. With constant saturation deficiency, their length of life is reduced to between one-half and two-thirds by a rise in temperature of 10° C. [18° F.]. Compared with the effect of saturation deficiency, that of temperature upon the longevity of fleas is, within the range of climatic conditions over the greater part of India, a smaller one. A variation in saturation deficiency from 5 mm. to 35 mm., such as occurs in the plains of Northern India at different seasons, would, accordingly, shorten the average duration of life of wandering rat fleas. As a rise in mean temperature occurs simultaneously with the increase in saturation deficiency, and may amount to a difference of 20° C. between January and June, this would reduce the length of life of wandering fleas to about one-third. The effect of saturation deficiency and increased temperature will be additive and would go a long way to explain some of the climatological features of the epidemics.

Petrie (G. F.) & Todd (R. E.), assisted by Skander (R.) & Hilmy (F.). **A Report on Plague Investigations in Egypt.**—*Jl. Hyg.*, xxiii, no. 2, pp. 117–150, 1 map, 2 charts. Cambridge, November 1924.

This is an abridged account of the authors' original report, a review of which has already been given [*R.A.E.*, B, xii, 187].

Johnston (H. B.). *Heliothrips indicus* (**Bagnall**) **injurious to man in the Sudan.**—*Ent. Mo. Mag.*, lxi, pp. 132–133. London, June 1925.

Heliothrips indicus, Bagn., a pest of cotton in the Sudan, is recorded as attacking man, the bite of this thrips causing severe irritation followed by inflammation. In one case slight poisoning took place.

Hoffman (W. A.). **A Review of the Species of** *Culicoides* **of North and Central America and the West Indies.**—*Amer. Jl. Hygiene*, v, no. 3, pp. 274–301, 2 pl., 1 fig. Baltimore, Md., May 1925.

Among the species dealt with are *Culicoides loughnani* var. *jamaicensis*, n., from Jamaica ; *C. canithorax*, sp. n., from Georgia ; *C. trinidadensis*, sp. n., from Trinidad ; *C. venustus*, sp. n., from Maryland ; *C. yukonensis*, sp. n., from Yukon ; *C. cockerelli* var. *tristriatulus*, n., from California ; *C. diabolicus*, sp. n., from Panama ; *C. baueri*, sp. n., from Maryland. A key to the species is given.

Barnes (M. E.). **The Toxic Action of Oil Films upon Mosquito Larvae with particular reference to Pine Oil Films.**—*Amer. Jl. Hygiene*, v, no. 3, pp. 315–329. Baltimore, Md., May 1925.

Pine oil, though very toxic to mosquito larvae, is not suitable for use on water, as the film it forms breaks up too rapidly for practical

purposes. Experiment has shown, however, that it can be successfully applied as a toxic agent in a suitable oil mixture. A mixture of 9 parts of crude oil to 1 part of pine oil produces a better film than either ingredient singly, and one that is highly effective in destroying all stages of Anopheline and Culicine larvae and pupae. The eggs of *Anopheles quadrimaculatus*, Say, are, however, partly resistant to pine oil acting through films. Anopheline and Culicine larvae may, in many cases, be resuscitated after prolonged submersion in water, or even after being in contact with oil films, and their death is apparently brought about either directly by the effects of pine oil or by drowning while under the effects of the drug.

Mills (R. G.). **Some Observations and Experiments on the Irritating Properties of the Larva of** *Parasa hilarata*, **Staudinger.**—*Amer. Jl. Hygiene*, v, no. 3, pp. 342–363, 11 figs. Baltimore, Md., May 1925.

During 1923 a number of cases of painful dermatitis produced by contact with the caterpillars of *Parasa hilarata*, Staud., occurred in Peking. The injury was found to be due to the mechanical introduction of a toxic substance by contact with any of the sharp-pointed spines widely distributed over its body. This toxic matter is contained within the spines, and was destroyed or rendered inactive by various solvents, such as benzene, xylol, acetic acid and ether; with water, formalin and sodium hydrate solution reaction occurred, though in a very slight degree. Living larvae proved more irritating than dead ones.

The caterpillars are the larvae of a Limacodid moth, which is a night flier and is entirely unrecognised among the Chinese.

Lapie (G.). **Les Chenilles venimeuses et les accidents éruciques.**—Paris, *Libr. Sci. nat.*, 1923, 191 pp., 4 pls. (Abstract in *Expt. Sta. Record*, lii, no. 4, p. 358. Washington, D.C., March 1925.) [Received 5th July 1925.]

The various parts of this work deal with venomous caterpillars, the dermatitis caused by the oak processionary [*Cnethocampa processionea*], the pine processionary [*C. pityocampa*] and *Bombyx rubi*, and affections caused by the brown-tail moth [*Nygmia phaeorrhoea*] and moths of the genus *Hylesia*.

Margarinos Torres (C.). **Déterminisme de la liberation spontanée des larves d'***Habronema muscae* **(Carter, 1861) par la trompe de la mouche dometique : importance de l'hématotropisme.**—*C.R. Soc. Biol.*, xciii, no. 20, pp. 33–35. Paris, 12th June 1925.

It has previously been shown that the emission of larvae of *Habronema* from the proboscis of *Musca domestica* is a spontaneous action depending entirely on the two essential conditions of heat and humidity. The author has recently found by experiment that adult flies infested with *H. muscae* will spontaneously eject their parasites on to defibrinated horse's blood when quite cold, showing that in this case the essential factors are the presence of blood and humidity of the medium to which the fly is attracted. This explains the frequency with which larvae of *H. muscae* are found in the wounds of Brazilian horses. It is obvious also that larvae of *Habronema* can be obtained without killing the insect host.

MARGARINOS TORRES (C.). **L'hématotropisme des larvae mûres d'***Habronema muscae* **(Carter, 1861).**—*C.R. Soc. Biol.*, xciii, no. 20, pp. 38–39. Paris, 12th June 1925.

Further investigations into the phenomenon of spontaneous ejection of the larvae of *Habronema muscae* from the proboscis of *Musca domestica* into defibrinated horse-blood have shown that the haematotropic reaction is entirely specific; ejection could not be obtained by the use of the blood of any other animal (man, guineapig, rabbit, etc.), but only on that of the horse. There is, therefore, no danger of the contamination of bleeding wounds on man with larvae of *H. muscae*. The part played by haematotropism in the liberation of the larvae of other parasitic Nematodes, especially of *Filaria*, should be worth investigating.

RODENWALDT (E.). **Kaart en determineertabel van de Anophelinen van Nederl. Oost-Indië.** [A Chart and an Identification Table for the Anophelines of the Dutch East Indies.]—*Burg. Geneesk. Dienst.* Batavia, 1924. [Received 29th June 1925.]

This guide, enabling medical officers to identify the Anophelines of the Dutch East Indies, consists of a key in the form of a table and of 2 charts, each dissected and mounted on linen, in which the distinguishing characters are figured and described.

VAN HASSELT (T. L.). **The Sanitation of Baoe-Baoe, Capital of the Sub-Division Boeton (S.E. Celebes).**—*Meded. Burg. Geneesk. Dienst. Ned.-Indië*, 1925, no. 1 (Foreign Edn.), pp. 72–85, 5 figs., 4 pls., 1 map. Batavia, 1925.

This paper describes the reclamation of a swamp of about 30 acres, regarded as the probable breeding-place of Anophelines; complete success was attained. The only Anophelines subsequently collected appeared to be *Anopheles vagus*, but it was not found possible to exterminate the Culicines.

SOBRINO PAZ (A.). **Gastrofilosis equina y** *Gastrophilus duodenalis*.—*Gaceta rural*, xviii, no. 214, pp. 933–939, 6 figs. Buenos Aires, May 1925.

A short account is given of the infestation of horses by *Oestrus nasalis* (*Gastrophilus duodenalis*). The morphology and biology of the fly are briefly described.

PERKINS (M.). **On** *Acanthophthirius etheldredae*, **a new Genus and Species of Anoplura from the Pipistrelle Bat.**—*Ann. Mag. Nat. Hist.*, xvi, no. 91, pp. 175–178, 1 pl. London, July 1925.

Acanthophthirius etheldredae, gen. et sp. n., is the only louse yet recorded from the bat; it was found among a large number of Acarids on *Pipistrellus pipistrellus* from the roof of Ely Cathedral.

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Austen (E. E.). **A Contribution to Knowledge of the Blood-sucking Diptera of the Dardanelles.**—*Bull. Ent. Res.*, xvi, pt. 1, pp. 1–23, 6 figs. London, July 1925.

This list is based on two small collections, one made in Gallipoli and the other on the Asiatic shore near Chanak. As the environmental and other conditions of the two localities are probably closely similar, it is somewhat remarkable that while 2 species of *Pangonius* occurred in Gallipoli, this Tabanid genus was not represented on the Asiatic shore.

In all 38 species are recorded, of which the new ones are :—*Simulium pulchripes ; Silvius inflaticornis ; Haematopota fraseri ; H. latebricola ; H. belligera ; Tabanus fraseri ;* and *T. oppugnator.*

Haga (J.). **A New** *Uranotaenia* **(Culicidae, Diptera) from Alor, Lesser Sunda Islands.**—*Bull. Ent. Res.*, xvi, pt. 1, pp. 43–44. London, July 1925.

Uranotaenia kalabahensis, sp. n., is described from the Lesser Sunda Islands, Dutch East Indies. The description of *U. papua*, Brug, is completed from individuals bred from larvae taken in the Moluccas.

Kligler (I. J.) & Theodor (O.). **Effect of Salt Concentration and Reaction on the Development of** *Anopheles* **Larvae.**—*Bull. Ent. Res.*, xvi, pt. 1, pp. 45–49. London, July 1925.

The authors' summary of this paper is as follows :— Experiments are reported on the effect of salinity on *Anopheles* larvae. It is shown that *A. elutus*, *A. superpictus* and *A. sergenti* show a decided selective capacity for egg-laying, depositing more than 75 per cent. of their layings in fresh water or water of low saline content. It is also shown that salt concentrations of M/4 and higher are toxic to these eggs and larvae. In so far as reaction is concerned, a slightly acid reaction (pH 6·6 to 6 8) favours more active development, although larvae will develop in alkaline solutions. The reaction of the medium also seems to modify the effect of the salinity. In an alkaline substrate, M/8 salt solution is more favourable than lower salt concentrations, whereas in acid substrates the reverse seems to be the case.

Swynnerton (C. F. M.). **The Tsetse-fly Problem in the Nzega Sub-District, Tanganyika Territory.**—*Bull. Ent. Res.*, xvi, pt. 1, pp. 99–109, 3 pls. London, July 1925.

At Shinyanga the tsetse-flies have completed their invasion of the bush and are now driving the main population out of the open country [*R.A.E.*, B, xiii, 105], whereas at Nzega, though they have in places reached the open country and begun to drive the population back, they are for the most part still advancing through the less inhabited bush. The position is similar to that existing in parts of Rhodesia and Nyasaland.

The topography and history of the district are described, and the present situation with regard to the fly is discussed. The older bush is for the most part infested with *Glossina morsitans*, and the younger is already infested or becoming infested with flies that appear to be advancing on several fronts. *G. swynnertoni* is spreading, and being particularly adapted to dry thorn bush, is probably capable of infesting

all portions so far uninfested as well as all the culture steppe. There is a large local population, which, it is hoped, may become interested in the problem before the latter reaches the stage it has arrived at in Shinyanga. For this reason work has been begun on the Nzega problem conjointly with that in Shinyanga [*loc. cit.*]. The problem with regard to local conditions is discussed; for further particulars concerning regulated grass burning the author refers the reader to his previous paper [*R.A.E.*, B, ix, 97], in which the difficulties, administrative and other, are discussed at some length. Some of these are here repeated with a few additions. Burning the country should not cease until it can be fairly fully stocked; otherwise it reverts to bush and thickets capable of harbouring the fly and which become difficult and expensive ever to clear again. Where such objectionable thicket has already become continuous and extensive, it would probably be best to encourage its transformation into valuable high forest and to continue to preserve it from burning. Forest reserves and established grazing must be protected from regulated burning, just as they have to be against the present annual native fires.

[**An Outbreak of** *Echidnophaga gallinacea*.]—*Jl. Econ. Ent.*, xviii, no. 3, p. 570. Geneva, N.Y., June 1925.

An unprecedented outbreak of *Echidnophaga gallinacea*, Westw. (sticktight flea) has occurred throughout the south-western United States, the loss among young chickens being particularly severe, while egg production has been reduced by from 5 to 50 per cent. The total loss during the spring season has been estimated at over £200,000.

Hall (M. C.). **Parasites and Parasitic Diseases of Dogs.**—*U.S. Dept. Agric.*, Dept. Circ. 338, 28 pp., 32 figs. Washington, D.C., May 1925.

An account is given of the conditions produced by various parasites and diseases in dogs, their causes and treatment. They include the following Arthropods:—*Sarcoptes scabiei canis*, *Notoedrus* (*Notoedres*) *cati*, *Otodectes cynotis*, *Demodex canis*, *Leptus* (*Trombicula*) *irritans*, *Dermacentor variabilis*, *Rhipicephalus sanguineus*, *Haematopinus* (*Linognathus*) *piliferus*, *Trichodectes latus*, *Ctenocephalus canis*, *C. felis*, *Pulex irritans* and *Echidnophaga gallinacea*.

Allen (J. A.). **Fox Farming and its Veterinary Problems.**—*Jl. Amer. Vet. Med. Assoc.*, lxvii, no. 4, pp. 443–451. Detroit, Mich., July 1925.

The Arthropod parasites recorded from domesticated foxes are the mite, *Otodectes cynotis*, Her., and the flea, *Ctenocephalus canis*, Curt. The symptoms produced by them and the methods recommended for their treatment are described.

Hardenbergh (J. G.) & Schlotthauer (C. F.). **Demodectic Mange of the Goat and its Treatment.**—*Jl. Amer. Vet. Med. Assoc.*, lxvii, no. 4, pp. 486–489. Detroit, Mich., July 1925.

Mange of the goat caused by *Demodex folliculorum* (hair-sac mite) is probably rare in the United States [*cf. R.A.E.*, B, xiii, 52]. The injury

to the skin, as compared with the infestation in dogs, is so slight that it might easily be overlooked. It has always been considered incurable. In the present cases all the nodules were opened, the contents emptied, a few drops of 10 per cent. carbolic acid injected into them, and the immediate area painted with iodine. A year after the original cases had been observed, there had been no recurrence of the infestation in them, and only one fresh case had been noticed.

Aynaud (—). **Kystes à *Demodex* et abcès du mouton.**—*C.R. hebdom. Acad. Sci.*, clxxxi, no. 1, pp. 62–64. Paris, 1925.

The pathogenic rôle attributed to *Demodex* has, up to the present, been limited to the production of epidermal lesions, but the author's investigations with sheep show that these mites may produce subcutaneous cysts and abscesses.

The larvae of *Demodex* may, however, disappear entirely from lesions that they have caused, so that a late stage of a lesion may appear to be an ordinary subcutaneous suppuration of unknown origin. It is possible that *Demodex* has some connection with the origin of caseous suppuration, and, in this case, anti-parasitic measures might perhaps control the spread of the disease. These facts may be of interest from the point of view of the parasitic theory of cancer. The verifying of a possible subcutaneous development and of the total disappearance of the parasites at an advanced stage of development is a possible answer to certain objections made to this theory.

Kennedy (A. M.). **Parasitology for Medical Students.**—8vo, x+ 142 pp., 1 pl., 61 figs. London, Humphrey Milford, Oxford Univ. Press, 1925. Price 10*s.* 6*d.* net.

This book is based on the clinical teaching of the author and is designed for medical students and practitioners rather than for those desiring to specialise in parasitology. In the one chapter coming within the scope of this *Review*—"Insects and Arachnoids" (pp. 1–41)—there are numerous serious inaccuracies.

Parasitologia Mauritanica. Arthropoda (3e Partie).—*Bull. Com. Etudes hist. et sci. Afr. franc. occid.*, viii, no. 1, pp. 93–104, 3 figs. Paris, January–March 1925. [Received 6th July 1925.]

When on an expedition for studying the parasites of fish in Mauretania (French West Africa) Mr. T. Monod also made collections of parasites of other animals. The Arthropods, which are the subject of this part, are dealt with by various authors; the mites by Mr. Stanley Hirst, including the new species, *Liponyssus monodi* from *Acanthodactylus scutellatus*, and *Haemolaelaps mauretanicus* from *Gerbillus hirtipes*; the ticks by Dr. G. H. F. Nuttall; the fleas by Dr. K. Jordan; the lice by Dr. J. Waterston; and the Diptera by the collector himself.

Cleveland (L. R.). **Toxicity of Oxygen for Protozoa *in vivo* and *in vitro*; Animals defaunated without Injury.**—*Biol. Bull. Mar. Biol. Lab.*, xlviii, no. 6, pp. 455–468. Woods Hole, Mass., June 1925.

Oxygen at a pressure of 3·5 atmospheres is more than 40 times as toxic to the protozoa of termites as it is to the insects themselves. It

is therefore possible to remove all protozoa from them without injury to the host. Cockroaches harbour many kinds of protozoa, all of which are removed by oxygenation at 3·5 atmospheres in 3½ hours, whereas the cockroaches themselves are not killed for 90 hours. It is highly probable that all insect-inhabiting protozoa may be removed in this manner, and this should be useful in studying the part that insects play in the transmission of protozoa in man and other animals, and in plants.

BENSAUDE (M.). **Flagellates in Plants : A Review of Foreign Literature.**—*Phytopathology*, xv, no. 5, pp. 273–281. Lancaster, Pa., May 1925.

The literature reviewed includes that dealing with the transmission of plant flagellates by insects, such as *Nysius euphorbiae*, Horv., *Dieuches humilis*, Reut., and *Stenocephalus agilis*, Scop.

GILMER (P. M.). **A Comparative Study of the Poison Apparatus of certain Lepidopterous Larvae.**—*Ann. Ent. Soc. Amer.*, xviii, no. 2, pp. 203–239, 21 figs. Columbus, Ohio, June 1925.

The presence of poisonous properties among Lepidopterous larvae is much more common than is ordinarily supposed. The structures involved in urtication and the composition of the poison producing the symptoms are described in detail.

LAPIE (G.). **Les chenilles venimeuses et les accidents qu'elles provoquent chez l'homme et chez les animaux domestiques.**— *Vie agric. & rur.*, xxvii, no. 30, pp. 50–54, 7 figs. Paris, 25th July 1925.

This is a general account of various Lepidopterous larvae that produce skin lesions in man and animals as a result of contact with their irritating hairs, and contains much the same information as a paper already noticed [*R.A.E.*, B, xiii, 130].

GROPENGIESSER (C.). **Untersuchungen über die Symbiose der Blattiden mit niederen pflanzlichen Organismen.** [Researches on the Symbiosis of Blattids with lower Plant Organisms.]—*Centralbl. Bakt., Paras. Infekt.*, IIte Abt., lxiv, no. 24–26, pp. 495–511, 2 pls. Jena, 20th July 1925.

A bacillus isolated from the fat-bodies of *Blattella* (*Blatta*) *germanica* and *Blatta* (*Periplaneta*) *orientalis* resembles *Bacillus cuenoti*, obtained by Mercier from cockroaches. Under certain conditions this bacillus is highly pathogenic to higher animals such as rabbits.

MARGARINOS TORRES (C.). **Sur l'habronémose pulmonaire expérimentale.**—*C.R. Soc. Biol.*, xciii, no. 22, pp. 214–216. Paris, 26th June 1925.

The experiments here described confirm the fact that larvae of *Habronema muscae* are capable of reaching the lungs of the host [*R.A.E.*, *B*, xii, 68].

METALNIKOW (I.). **L'immunité des mites des abeilles** (*Galleria mellonella*) **contre la tuberculose pendant les stades larvaires et la métamorphose.**—*Ann. Inst. Pasteur*, xxxix, no. 7, pp. 629–631. Paris, July 1925.

It has been proved that *Galleria mellonella* is endowed with a natural immunity from tuberculosis in all the stages of its life-history, including the actual period of transformation from larva to pupa.

IVANOFF (E.). **Un nouveau mode de conservation et d'envoi des Trypanosomes et des Spirochètes dans des larves de** *Galleria mellonella*.—*C.R. hebdom. Acad. Sci.*, clxxxi, no. 5, pp. 230–232. Paris, 1925.

In view of the fact that trypanosomes and certain spirochaetes will live as well in the blood of larvae of *Galleria mellonella* as in that of mice, guineapigs, etc., it is suggested that these insects would be a convenient medium for preserving these protozoa and for transporting them from place to place [*cf. R.A.E.*, B, xiii, 63].

CHIGASAKI (I.). **Sur la sensibilité des chenilles, des chrysalides et des papillons de** *Galleria mellonella*.—*C.R. Soc. Biol.*, xciii, no. 26, pp. 480–482. Paris, 24th July 1925.

Experiments with larvae, pupae and adults of *Galleria mellonella* injected with the microbe of Danysz showed the larvae to be most resistant and the pupae least so. The resistance of the larvae diminishes as they approach the pupal stage.

TOUMANOFF (K.). **L'accroissement pathologique des phagocytes de** *Dixippus morosus* **par suite d'injections de** *Bacillus tumefaciens*.—*C.R. Soc. Biol.*, xciii, no. 26, pp. 482–484. Paris, 24th July 1925.

Experiments with various injections of *Bacillus tumefaciens* into *Carausius* (*Dixippus*) *morosus* has not revealed the nature of the influence of the micro-organism on the phagocytes of the insect, though it causes an increase of them.

RONDELLI (M.). **Contributo alla conoscenza della simbiosi negli ematofagi (Zecche).** [A Contribution to the Knowledge of Symbiosis in Ticks.]—*Atti R. Accad. Scienze Torino*, lx, pp. 81–85, 1 fig. Turin, 1925.

In this preliminary paper the presence of bacteria in a female tick, *Ixodes* sp., taken from a bovine host, is recorded. These bacteria were also found penetrating into the eggs.

FERGUSON (E. W.). **Australian Ticks.**—*Austr. Zool.*, iv, no. 1, pp. 24–35. Sydney, 12th June 1925.

A slightly fuller version of this paper has been noticed elsewhere [*R.A.E.*, B, xiii, 65].

LARROUSSE (F.). **Contribution à l'étude des tiques de l'Annam : description de deux espèces nouvelles du genre** *Haemaphysalis* : *H. obesa* **n.sp. et** *H. lagrangei* **n.sp.**—*Ann. Paras. hum. et comp.*, iii, no. 3, pp. 301–305, 3 figs. Paris, July 1925.

No systematic study has been made of the ticks occurring in the French Colonies, and particularly in Indo-China. In this paper notes are given on six species collected in Annam, including descriptions of *Haemaphysalis obesa*, sp.n., and *H. lagrangei*, sp.n., taken on *Cervulus muntjac*.

LAVIER (G.). **Infections héréditaires par les parasites animaux.**—*Ann. Paras. hum. et comp.*, iii, no. 3, pp. 306–324. Paris, July 1925.

The author discusses, largely from the work of other writers, the possibilities of hereditary infection of animals by parasites. Intra-uterine infestation is undoubtedly possible, its occurrence depending above all on the biology of the parasite in question. It has as yet been observed only in the case of protozoa and helminths. In the case of spirochaetes, intra-uterine infestation is frequently observed (*e.g.*, recurrent and tick fever) ; in trypanosomes, it is possible but exceptional ; and in malaria and piroplasmosis it is possible but rare.

Hereditary conservation of the virus in the intermediate invertebrate host occurs frequently in the case of certain spirochaetes (tick fever, avian spirochaetosis), exceptionally in others (recurrent fever), is non-existent in the case of certain protozoa (malaria), but is constant in certain others (various piroplasms).

LANGERON (M.). **Hibernation de** *Theobaldia annulata*.—*Ann. Paras. hum. et comp.*, iii, no. 3, pp. 325–326. Paris, July 1925.

The author's observations in France confirm previous ones regarding the hibernation of adults of *Theobaldia annulata* [*R.A.E.*, B, xiii, 44], and many instances are cited of captures of females flying in houses during the winter, one of which was observed biting on 14th December. No males have been found hibernating, although they have been observed as late as November and December.

[RUKHADZE (N. P.)] ROUKHADZÉ (N.). **Le paludisme à Oudé (Géorgie) (Etude sur le paludisme en montagne).**—*Bull. Soc. Path. exot.*, xviii, no. 5, pp. 383–389. Paris, 1925.

Oudé is a village in eastern Georgia about 3,600 ft. above sea-level. The seasonal history of malaria is discussed. No mosquitos were discovered in the village itself, but lower down the slopes among the orchards and pasture fields *Culex* and *Anopheles maculipennis* were found. Infection is apparently acquired by men working on these slopes, the population remaining in the village being almost entirely immune. As there are no dwellings in the orchards, etc., where the mosquitos abound, it is concluded that they have adapted themselves to feeding by day. The sites of hibernation are unknown.

[Rukhadze (N. P.)] Roukhadzé (N.). **La compagne antipaludique à Gagry en 1923 et 1924.**—*Bull. Soc. Path. exot.*, xviii, no. 5, pp. 389–392, 1 graph. Paris, 1925.

The campaign of 1923 in Georgia has already been noticed [*R.A.E.*, B, xiii, 82]. The work was continued in 1924, and at the end of the campaign only *Anopheles bifurcatus*, which was apparently breeding in the forests, could be found.

Roubaud (E.). **Une nouvelle espèce de Puce-chique pénétrante, parasite des rats en Chine : *Dermatophilus lagrangei* n.sp.**—*Bull. Soc. Path. exot.*, xviii, no. 5, pp. 399–405, 6 figs., 1 pl. Paris, 1925.

Tunga (*Dermatophilus*) *lagrangei*, sp.n., was taken in Shanghai from the ears of a rat (*Mus decumanus*). It is compared with the other known species of this genus, *T.* (*D.*) *penetrans*, L., and *T.* (*D.*) *caecata*, Enderl.

Marchoux (E.). **Modes divers d'hibernation de l'*Anopheles maculipennis*.**—*Bull. Soc. Path. exot.*, xviii, no. 5, pp. 405–407. Paris, 1925.

In Corsica and Algeria adults of *Anopheles maculipennis* cannot be found in the winter, but a survey of the breeding-places has revealed larvae, some of which were almost fully developed. No pupae were found. It is, therefore, concluded that *A. maculipennis* lays eggs in the autumn, after which it seeks some suitable place for hibernation. In cold climates where human dwellings and animal shelters are suitable for the hibernation, the species survives the winter in the adult stage until the following spring, when another batch of eggs is laid. Under these conditions the climate is usually too cold for the eggs laid in the autumn to survive, whereas in warmer climates the eggs survive, but the adults disappear owing to the absence of suitable shelter in the way of stables, warmed houses, etc., for hibernation.

Descazeaux (J.). **Sur la présence au Chili de l'*Ornithodoros megnini*.**—*Bull. Soc. Path. exot.*, xviii, no. 5, pp. 408–409. Paris, 1925.

Ornithodorus megnini, Dug., occurs in Chile, being limited to the northern and central areas. It lives almost entirely in the ears of young calves, though it may occasionally be found in the ears of dogs. Neither anaplasmosis nor piroplasmosis occurs in the same localities as the tick. It is most abundant during December and January, and though it does not transmit any disease, the lesions caused in the ears of the calves may develop into disease of the middle ear ; in any case, the animals refuse their food and frequently die.

Roubaud (E.). **Nouveaux Diptères piqueurs de l'Est africain.**—*Bull. Soc. Path. exot.*, xviii, no. 6, pp. 465–469, 2 figs. Paris, 1925.

Hippobosca camelopardalis, sp.n., taken on a giraffe, and *Stomoxys rhodainica*, sp.n., are described from East Africa.

Charrier (H.). **Ixodes de la région de Tanger.**—*Bull. Soc. Path. exot.*, xviii, no. 6, pp. 469–470. Paris, 1925.

Of the small number of ticks that occur in Tangier, the most abundant are *Rhipicephalus sanguineus*, Latr., found on dogs and cattle; *R. bursa*, C. & F., on cattle and horses; *Boophilus annulatus* var. *calcaratus*, Neum., on cattle; and *Hyalomma aegyptium*, L., on cattle and horses.

Parrot (L.) & Foley (H.). **Remarques épidémiologiques sur le bouton d'Orient en Algérie.**—*Bull. Soc. Path. exot.*, xviii, no. 6, pp. 485–495. Paris, 1925.

A review of the incidence of oriental sore in Algeria suggests that it is widely distributed in that region and that fresh records are not necessarily due to a recent introduction or spread of the disease. The irregularity in its occurrence is a result of the varied distribution and abundance of the insect vectors. There is a definite close relation between the occurrence of oriental sore and the distribution of *Phlebotomus*. The maximum incidence of the disease is usually from about the middle of October to the middle of December, and this just allows for the average incubation period of about 6 weeks after the maximum abundance of *Phlebotomus*.

Nicolle (C.) & Anderson (C.). **Recherches expérimentales sur le mode de transmission du Kala Azar.**—*Arch. Inst. Pasteur Tunis*, xiv, no. 3, pp. 264–277. Tunis, 1925.

Further experiments regarding the transmission of canine kala-azar [*cf. R.A.E.*, B, xii, 169] are described, in which negative results attended attempts to transmit the disease by the agency of bed-bugs [*Cimex*]; and it is concluded that though it might be possible to transmit the virus from dog to dog or from dog to man by means of bed-bugs, they cannot be considered natural vectors of the disease.

Yoshikawa (M.). **On *Oedemagena tarandi*, L., parasitic upon deer in Sakhalin.**—*Jl. Sapporo Soc. Agric. & Forestry*, xvi, no. 71, pp. 381–385, 1 pl. Sapporo, April 1925.

In North Sakhalin the adults of the Oestrid, *Oedemagena tarandi*, L., appear from June to August. They attack deer by day and oviposit on the upper part of the host's body. The larvae upon hatching enter beneath the skin and hibernate there. They leave the host in May or June of the next year, and pupate on the ground. One deer may be attacked by 50–100 larvae, and young animals are sometimes killed. Brief notes are given on the morphology of the adult and larva.

Walton (C. L.). **Notes on Warble Flies in North Wales.**—*Welsh Jl. Agric.*, i, no. 1, pp. 195–199. Cardiff, January 1925.

The warble-flies, *Hypoderma lineatum* and *H. bovis*, are a source of considerable loss to cattle-breeders in Great Britain. The former is by far the more abundant species in mid-Wales, probably because it is much less dependent on sunshine and the district is one of high rainfall. Tabulated records suggest a diminution in the abundance

of warble larvae following a cool, rainy spring in the preceding year. Mountain herds are frequently more severely infested than those of the lowlands, and there is generally heavier infestation on the rougher lands than in more cultivated districts. The indications are that washing the cattle with various preparations, and the use of tobacco powder, etc., against lice have a decided effect in reducing infestation ; shade and available water also appear to reduce or even prevent attack in some instances. The heaviest infestation is invariably among young cattle. Larvae of *H. lineatum* appear much earlier than those of *H. bovis* and leave the host for pupation much sooner ; there are also seasonal differences, the date of appearance of the first larvae differing widely according to climatic conditions. Horses are quite often attacked, though not so frequently as cattle. The iodoform and vaseline ointment used in America [*R.A.E.*, B, xi, 92] is very successful, and derris powder is also being tested. Some farmers claim good results from the use of strong salt solutions.

[Doinikov (A. V.).] **Дойников (А. В.). Вредители сельского хозяйства в Калмыцкой Области и борьба с ними.** [Agricultural Pests in the Kalmyck Region and their Control.]—**Калмыцкая Область** [*Kalmyck Region*], 1925, no. 2, separate 11 pp. Astrakhan, 1925.

The insect pests recorded include *Oestrus intestinalis* (*Gastrophilus equi*) and *O.* (*G.*) *haemorrhoidalis* from the stomach of horses ; *Rhinoestrus purpureus* from the naso-pharyngeal tract of horses ; and *Hypoderma bovis* from the skin of cattle.

Villeneuve (J.). **L'Oestridomorphisme.**—*Ency. ent.* Série B, Dipt. ii, no. 1, pp. 1–4. Paris, 15th January 1925. [Received 20th July 1925.]

This paper discusses the resemblance to the Oestrids of certain Tachinids, and suggests that the family Oestridae should include two groups, "Oestridae genuinae" and "Tachino-Oestridae" (Oestridae dubiosae of Brauer and Bergenstamm). [*Cf. R.A.E.*, B, xiii, 70.]

Séguy (E.). **Déscription d'un nouveau** *Simulium*.—*Ency. ent.* Série B, Dipt. ii, no. 1, p. 6. Paris, 15th January 1925. [Received 20th July 1925.]

Simulium varicolor, sp.n., is described from Aube, France.

Séguy (E.). **Notes sur les Moustiques de l'Afrique mineure, de l'Egypte et de la Syrie. I.**—*Ency. ent.* Série B, Dipt. ii, no. 1, pp. 13–21, 5 figs. Paris, 15th January 1925. [Received 20th July 1925.]

A description is given of the larvae of *Culex mimeticus*, Noé, and *C. pseudomimeticus*, sp.n., both from Camargue, France, with a further account of the larvae of *C. laivieri*, Larrousse. These data render necessary a partial modification of a key given in a previous paper [*R.A.E.*, B, xii, 113].

Swellengrebel (N. H.). **Some Aspects of the Malaria Problem in Italy. Some Notes and Impressions on Malaria in the Ukraine and in Roumania.**—Fol. pp. 1–4, 1–9 & 1–6. Geneva, Soc. des Nations, May 1925.

A survey of the campaign against malaria carried out in Italy during the past two years shows the problem to consist of two phases : the individual phase, which aims at a rapid reduction of the harm done to the population by the disease, and the general sanitary phase, aiming at improvement of the economic conditions of the population, by increasing the amount of arable land, education, housing, etc. In Rumania and the Ukraine, the only malaria-carrying species found was *Anopheles maculipennis* ; in the former country the destruction of all mosquitos in houses (among which are the majority of infected individuals) should be aimed at ; in stables, where many more mosquitos are found than in houses, the possibility of killing infected ones or those likely to infect man is small. In the Ukraine, remedial measures have been largely restricted to quinine distribution, and it is suggested that measures against mosquito larvae should be limited to regions where they can be accomplished advantageously and by close co-operation between the medical entomologist and the agricultural engineer.

Grassi (B.). **Contribuzione allo studio della biologia dell' *Anopheles superpictus*, Grassi.** [A Contribution to the Study of the Biology of *A. superpictus*.]—*Atti R. Accad. Naz. Lincei*, Rend. Classe sci. fis. mat. e nat., Ser. 6, i, no. 12, pp. 689–694, 1 pl. Rome, 21st June 1925.

Though *Anopheles superpictus*, Grassi, occurs in North Italy, it is far more common in the south. It is on the wing from July to October, with a maximum in July and August, and is therefore later than *A. maculipennis*, Mg. (*claviger*, auct.) which reaches its maximum in May and June. In the aquarium no great difference was noted in the habits of the larvae of the two species, but those of *A. superpictus* seem to remain at the bottom more than those of *A. maculipennis* and less than those of *A. bifurcatus*, L. The eggs of *A. superpictus* are laid in a ribbon. They are smaller than those of *A. maculipennis* and are remarkable in that they lack the air chambers usually characteristic of eggs of Anophelines. They cannot develop in salt water. Some details are given of the structure of the aedoeagus.

Swellengrebel (N. H.). **A Summary of the more important Facts on Adult Anophelines and their Larvae, observed by us or brought to our Notice during our Tour through Eastern Europe and Italy (May-September 1924).**—Fol. 19 pp., Geneva, Soc. des Nations, May 1925.

Among the salient points brought out during this survey of Anopheline conditions in Eastern Europe and Italy is the adaptability of the larvae of *Anopheles maculipennis*, which thrive in breeding-places where they would not occur if better were available. The presence of macroscopic vegetation or of very clear water is not indispensable, nor do small quantities of *Lemna minor*, *Chara*, muddy (but not foul) water, shade or running water (if not running too quickly) prevent their breeding, but decaying vegetation, foul water or peat

sufficient to colour it seem to be prohibitive. The range of flight of this species from its breeding-places must, from the evidence of adults found in buildings, be increased from 500 to 1,000 metres. Large swamps are less important breeding-places than small pools and puddles in swampy or even in fairly dry areas, and conversion of a swamp drained by ditches may, and often does, mean an increase in the actual breeding area. In addition to *A. maculipennis*, the only species observed during the survey (except for a few *A. bifurcatus*) was *A. elutus*. As *A. bifurcatus* does not appear before the end of August, it cannot play an important part in the transmission of malaria in Macedonia. *A. hyrcanus* (*pseudopictus*) is said to be important in rice-fields, but not to be prevalent before August. *A. superpictus*, which replaces *A. maculipennis* in the second half of August, is considered by some investigators to be an important vector of malignant tertian malaria.

The evidence gathered during the tour indicates that man becomes infected outside his habitations (in the wider sense of the word), but further investigation on these lines is necessary. A marked discordance is noticed between the occurrence of Anophelines in houses and the incidence of malaria. There is some evidence that they can infect man during the winter season in cold countries. In estimating the importance of breeding-places as a cause of malaria, the possibility of residual anophelism (Anophelines remaining in houses and stables after the breeding-places have been destroyed) should be taken into account. Hibernation of *A. maculipennis* has been observed in stables and other buildings in many localities, but continued feeding during hibernation was recorded only once.

It is suggested as very advisable that all malaria statistics should be so designed or accompanied by explanations as to convey to foreign readers the same idea of their value as is held in the country of their origin ; and that the Malaria Commission should use its influence to arrive at some common understanding regarding the standardisation of such statistics. In districts where *A. maculipennis* is the vector of malaria, it is recommended that further enquiry should be made into the possibility and frequency of human malaria infection outside houses or shelters equivalent to houses ; the conditions offering the least possible shelter to Anophelines in houses ; the limits of efficiency of anti-larval measures and the conditions rendering it justifiable to undertake them ; the practical significance of residual anophelism in Europe ; exact data on the periodicity of Anophelines ; and the practical possibility of rendering large tracts of reclaimed land unsuitable as breeding-places for larvae. Data should also be collected to prove or disprove the theory that *A. maculipennis* breeding in water of a certain salinity becomes more dangerous than when breeding in fresh water.

MARTINI (E.). **Bei bionomischen und physiologischen Daten Temperaturangaben nicht vergessen.** [Temperature should always be taken into Consideration in Connection with Biological and Physiological Data.]—*Zool. Anz.*, lix, no. 5–6, pp. 170–172. Leipzig, 20th April 1924.

The author emphasises the importance of variation in temperature in connection with the study of bionomics and physiology, giving as an example his observations on *Anopheles maculipennis*, which requires

an average of 14½ days for development to the adult stage at a temperature of 24–27° C. [75·2–80·6° F.], 18 days at 20–22° C. [68–71·6° F.] and 30½ days at 16–19° C. [60·8–66·2° F.].

[Rukhadze (N. P.).] **Рухадзэ (Н. П.). Малярия в Дальском ущелье.** [Malaria in Abkhasia.]—*Russ. Jl. Trop. Med.*, 1924, no. 4–6, pp. 6–12. Moscow, 1924. [Received 25th June 1925.]

An account is given of the topography of certain localities in Abkhasia (Georgia) with the seasonal history of malaria and of *Anopheles maculipennis* and *A. bifurcatus* [*cf. R.A.E.*, B, xiii, 112]. Large collections of water in walnut trees formed one of the usual breeding-places for Anophelines.

[Popov (P. P.).] **Попов (П. П.). Обнаружение в Москве "*Phlebotomus* el Ghôr."** [The Occurrence of *Phlebotomus* el Ghor in Moscow.]—*Russ. Jl. Trop. Med.*, 1924, no. 4–6, p. 38. Moscow, 1924. [Received 25th June 1925.]

A Psychodid identical with Schroetter's *Phlebotomus* el Ghor [*R.A.E.*, B, xii, 63] was found by the author in a house in Moscow during March 1924. As has already been pointed out, it must be referred to the genus *Psychoda*, and its relation to oriental sore is very unlikely. Its occurrence in the adult stage in the winter, however, suggests the possibility that species of the related genus *Phlebotomus* may overwinter in this stage in the warmer countries.

[Nabokov (V. A.) & Nikolski (V. V.).] **Набоков (В. А.). и Никольский (В. В.). К вопросу о гибели личинок и куколок комаров при заливке поверхности вод керосином или нефтью.** [The Destruction of Mosquito Larvae and Pupae by oiling the Water Surface with Paraffin or Petroleum.]—*Russ. Jl. Trop. Med.*, 1924, no. 4–6, pp. 39–42. Moscow, 1924. [Received 25th June 1925.]

As a result of experiments it is concluded that oil on the surface of water kills the larvae and pupae of mosquitos by its chemical action and not as a result of mechanically depriving them of oxygen. Both *Anopheles maculipennis* and *Culex pipiens* survived for 36 hours in a container full of water from which free air was excluded. Various oils were tested, and in all cases the pupae succumbed more quickly than the larvae; this is explained by the fact that the former rise more frequently to the surface and thus are more often in contact with the oil film.

[Palestine.] **Proceedings of the Eleventh Meeting of the Antimalarial Advisory Commission, May 19th, 1925.**—13 pp., multigraph.

The anti-malarial work in Palestine and various other countries was discussed. Col. S. P. James, in comparing the conditions in British India with those in Palestine, stated that the habits of the Anopheline mosquitos concerned in Jerusalem and in Bombay were similar, both breeding in wells, cisterns, etc. The species in Jerusalem was *Anopheles bifurcatus*, and, whereas in Jerusalem remarkable success had been achieved against the mosquito, in Bombay the results had been

negative, the factors militating against good results in the latter place being climatic, social and technical. The important points connected with this mosquito are the number of broods in a season and its method of passing the winter. Dr. N. H. Swellengrebel, in discussing the difference in the habits of *A. bifurcatus* in Holland and Palestine, pointed out that in Holland it was a wild species, which never entered houses, but that in Palestine it was essentially domestic and urban in distribution. Attention was also drawn to the fact that sharp distinctions among Anophelines between good and bad carriers of malaria were not so marked as generally believed, and instances were cited of an apparently harmless mosquito, such as *A. hyrcanus*, unexpectedly developing marked powers of carrying malaria.

Evans (A. M.). **A New Variety of** *Anopheles marshalli* **Theobald from the Belgian Congo.**—*Ann. Trop. Med. & Paras.*, xix, no. 2, pp. 211–213, 2 figs. Liverpool, 16th July 1925.

This new variety is described as *Anopheles marshalli* var. *moucheti*.

Rudolf (G. de M.). **The Incubation Period of Benign Tertian Malaria.**—*Ann. Trop. Med. & Paras.*, xix, no. 2, pp. 219–233, 9 tables. Liverpool, 16th July 1925.

The following is taken from the author's summary :—

The incubation period of naturally acquired benign tertian malaria is given by most authorities as being from 6 to 21 days with, however, wide variations. In 34 cases (chiefly from the literature) artificially infected by means of Anopheline mosquitos, the incubation period varied from 7 to 30 days as measured by the first date on which parasites were found, and, in 37 cases, from 7 to 25 days as measured by the first rise of temperature. Subcutaneous inoculation of malarial blood gives, according to a number of writers, an incubation period of from 1 to 32 days. Of a series of 50 general paralytics inoculated subcutaneously with *Plasmodium vivax*, 90 per cent. exhibited a rise of temperature to from 101° F. to 102·9° F. in less than 21 days after inoculation, and 46 per cent. in less than 10 days. The first rise of temperature over 103° F. occurred within 21 days in 84 per cent. and within 10 days in 38 per cent. With intravenous inoculation of malarial blood the incubation period was from 1 to 19 days in a series of 60 cases. In a series of 28 cases inoculated intramuscularly the incubation period varied from 6 to 23 days. In 10 series of cases injected subcutaneously with malarial blood it was found that the incubation period decreased as the dose of parasites was increased.

Newstead (R.) & Potts (W. H.). **Some Characteristics of the First Stage Larva of** *Dermatobia hominis* **Gmelin.**—*Ann. Trop. Med. & Paras.*, xix, no. 2, pp. 247–260, 2 pls. Liverpool, 16th July 1925.

Dermatobia hominis, Say, differs from all other Oestrids in that, instead of laying eggs or larvae directly on the hair or skin of the host, it lays batches of eggs on the bodies of other insects, chiefly mosquitos. The larva does not apparently emerge until the mosquito alights on a warm-blooded animal. If it is unable to emerge completely during the time the mosquito is feeding, it will withdraw into the egg until the

mosquito alights on another warm-blooded animal. This may occur several times, the larvae being able to remain alive for 20 days before reaching a host. Recent work on the life-history is reviewed and various morphological characteristics are discussed. A list is given of the insects found carrying the eggs of *D. hominis* both under natural and experimental conditions and of the countries where they were found.

Jones (H. L.). **Report of the Health Department for Year ending 30th June 1922.**—*Northern Territory Australia: Rept. Administrator 1921–22*, pp. 18–20. Melbourne, 1923. [Received 27th July 1925.]

Only one case of locally-acquired malaria was recorded in the neighbourhood of Darwin during the year. Constant examination of the waters in and around the town, especially at the close of the wet season, disclosed a few Anopheline larvae. The larvae of *Culex fatigans* were found on 37 separate occasions in the street drains, but no case of filariasis was observed during the year. The favourite breeding-places of *Aëdes argenteus* (*Stegomyia fasciata*) are the roof gutters, especially where overhung by trees and creepers. No case of dengue or yellow fever was reported.

Other mosquitos found in and around Darwin were *Taeniorhynchus brevicellulus* (*Chrysoconops acer*), *Culex sitiens* (*Culicelsa paludis*), and *Aëdes vigilax*.

Hill (G. F.). **The Distribution of Anopheline Mosquitoes in the Australian Region, with Notes on some Culicine Species.**—*Proc. R. Soc. Victoria*, xxxvii (N.S.), pt. 1, pp. 61–77, 5 pls. Melbourne, 28th May 1925.

A knowledge of the distribution and habits of the various Anophelines that occur in Australia and New Guinea is an almost essential preliminary to effective anti-malaria measures, as the identity of the carrier or carriers is still doubtful. The breeding-places of *Anopheles annulipes*, Wlk., have already been described [*R.A.E.*, B, x, 232], but as a result of more recent research, this information must now be regarded as applying more especially to related forms of doubtful status. In Papua, where malaria is endemic, measures have been confined to the more obvious surface accumulations of water in ignorance of the fact that native canoes and seepage are sources of potential, if not actual, breeding-places of two species, one of which has not hitherto been recorded from the Australian region.

Of the Anophelines recorded from Australia, *A. stigmaticus*, Skuse (*corethroides*, Theo.) and *A. atratipes*, Skuse, are negligible as disseminators of malaria. *A. bancrofti*, Giles, was considered by Edwards in a recent paper [*R.A.E.*, B, xii, 113] to be almost certainly specifically distinct from *A. barbirostris*, Wulp, but the author is doubtful on this point. *A. annulipes*, Wlk. (*musivus*, Skuse), *A. mastersi*, Skuse, and *A. amictus*, Edwards, are all closely allied and form a well defined group, which probably includes the principal carrier or carriers of malaria in Australia. In addition to these, *A. punctulatus* var. *moluccensis*, Swell., occurs commonly in various localities between Port

Darwin and the Katherine River, whilst a single example from Borroloola is identical with *A. punctulatus*, Dön. Both have been shown to be carriers of malaria in New Britain.

The occurrence of *A. subpictus*, Grassi, in Papua is recorded for the first time from specimens bred by the author from beached native canoes near Moresby and from adults captured in various places.

A list is given of the Anophelines of New Guinea, New Britain and adjacent islands, with detailed notes on the Culicine mosquitos found in the area.

H[ILL] (G. F.). **Mosquitoes of Australia.**—*Victorian Nat.*, xlii, no. 2, pp. 45–46. Melbourne, June 1925.

The mosquito fauna of Australia and the adjacent islands, including Tasmania, is represented by about 100 species, some of which extend into New Zealand, New Guinea and the Oriental region. Of these only six are Anophelines. The actual number of indigenous species is probably considerably larger, since only a comparatively small area of the continent has been systematically searched for these insects. Two of the most abundant species, *Aëdes camptorhynchus*, Thoms., and *A. alboannulatus*, Macq., are very troublesome pests, and *Anopheles annulipes*, Wlk., is of importance as a possible, if not an actual, carrier of malaria in the northern states. Of the purely domestic species, *Culex fatigans*, Wied., is probably the best known and most troublesome indoors. As it rarely breeds elsewhere than in contaminated, stagnant water near dwellings, its scarcity or abundance is a fairly accurate index to the sanitary condition of the vicinity.

DYAR (H. G.) & SHANNON (R. C.). **The Types of Philippine Mosquitos described by Ludlow and other Notes on the Fauna (Diptera, Culicidae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 4–6, pp. 66–89. Washington, D.C., April-June 1925.

The species dealt with include: *Megarhinus nepenthis*, sp. n., *M. gigantulus*, sp. n., *Uranotaenia ludlowae*, sp. n., *U. clara*, sp. n., *U. innotata*, sp. n., *Catatassomyia meronephada*, gen. et sp. n., *Aëdes* (*Skusea*) *miachaetessa*, sp. n., *A.* (*A.*) *macrodixoa*, sp. n., *A.* (*A.*) *margarsen*, sp. n., *A.* (*A.*) *dux*, sp. n., and *Culex nematoides*, sp. n. *Tricholeptomyia*, gen. n., is erected for *T. nepenthicola*, Banks (*mus*, Dyar), this genus being the nearest approach in the Oriental fauna to the American Sabethine group.

The synonymy of several species is discussed, including *Anopheles gigas*, Giles (*formosus*, Ludl.); *A. ludlowi*, Theo. (*rossi* var. *indefinitus*, Ludl., *parangensis*, Ludl.); *A. fuliginosus*, Giles (*Chagasia lineata*, Ludl., *Kerteszia mcgregori*, Banks); and *A. pallidus*, Theo. (*philippinensis*, Ludl., *freerae*, Banks, *pampangensis*, Brun.).

A key is given to the small species of *Aëdes* belonging to the subgenera *Skusea* and *Aëdes*.

BRADLEY (G. H.). **The Larva of *Aedes thibaulti*, Dyar and Knab (Diptera, Culicidae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 4–6, pp. 89–91. Washington, D. C., April-June 1925.

The larva of *Aëdes thibaulti*, D. & K., is described from Louisiana.

Gage (E. H.). **Studies of Impounded Waters in Relation to Malaria.**—*Public Health Repts.*, xl, no. 26, pp. 1357–1375, 1 map, 1 chart, 1 pl. Washington, D.C., 26th June 1925.

These studies were conducted in the Piedmont region of North Carolina during 1923. Different types of impounded water were included, an attempt being made to present a clear picture of the possibilities of malaria transmission in each case, and to point out the precautions that were or should have been taken to minimise this danger. In all cases the chief mosquito concerned was *Anopheles punctipennis*. *A. quadrimaculatus* occurred in some instances, and a few individuals of *A. crucians* were taken. Certain procedures for the reduction of mosquitos in impounded waters have been outlined by the United States Public Health Service. These should be followed in all instances and are briefly summarised as follows : —Clean banks (controlling fluctuation of water level, removal of flotage) ; no aquatic vegetation reaching the surface of the water ; a minimum area of shallow overflow at summer water level ; care of imported labour ; impounding of the water during the winter months ; introduction of *Gambusia affinis* ; and occasional observation of the water and its immediate vicinity.

Rodenwaldt (E.) & Essed (W. F. R.). **Investigation into the Malaria at Tandjong Priok.**—*Meded. Dienst. Volksgezondheid Ned.-Indië*, Foreign edn., 1925, no. 2, pp. 89–121, 1 plan, numerous graphs. Batavia, 1925.

The sea-port of Tandjong Priok, Batavia, was notorious for malaria, which van Breemen found to be carried by *Anopheles ludlowi*, Theo., breeding in fish-ponds and swamps of brackish water on the coast [*R.A.E.*, B, ix, 36]. Next to *A. ludlowi*, *A.* (*Myzomyia*) *subpictus*, Grassi (*rossi*, Giles) probably played some part as a carrier. *A. ludlowi* breeds readily in stagnant water. Unless the water contains more than 3 per cent. of salt, it is indifferent to the salinity ; it can also breed in fresh water. In the fish-ponds it seems to thrive best at a salt percentage of 1·2 to 1·8. The chief condition seems to be the presence of decaying matter and breeding is not affected by pollution. The sprinkling of breeding-places with oil residue every 5 days absolutely prevents the development of this species, and the incidence of malaria has been considerably diminished by this means.

Swellengrebel (N. H.). *Cellia errabunda* **n. sp., een nieuwe Anopheline voor Nederlandsch-Indië.** [*Anopheles errabundus*, sp. n., an Anopheline new for the Dutch East Indies.]—*Nederl. Tijdschr. Geneesk.*, lxix, 1st Half, no. 17, pp. 1913–1915, 5 figs. Amsterdam, 1925.

Anopheles (*Cellia*) *errabundus*, sp. n., is described from Borneo. It is allied to *A.* (*C.*) *argyritarsis*, R.D.

Beven (J. O.). **Trypanosomiasis in Kenya Colony. A Report on a Sleeping Sickness and Tsetse Fly Survey of the Nyanza Province.**—*Trans. R. Soc. Trop. Med. & Hyg.*, xviii, no. 8, pp. 439–454. London, June 1925.

Sleeping sickness was found to be fairly widespread and to be increasing in certain localities of the Nyanza Province of Kenya.

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The sitatunga (*Tragelaphus spekei*), considered by some to be the reservoir of *Trypanosoma gambiense*, was only found in a swamp where no *Glossina* and sleeping sickness occur, and unless some other animal is found to be implicated, the infection of *Glossina* must be derived from man. In all the areas under discussion, hippopotamus, crocodile and *Varanus* are found in abundance. The most common species of *Glossina* is *G. palpalis*, its habitat being the usual one for this species, embracing the lake shores and river banks, wherever sufficient shade is found together with a dry, loose soil. The statement sometimes made that *G. palpalis* never occurs in papyrus is considered to be only partly true. It is not found in extensive swamps, but where the papyrus occurs on ground formerly flooded but now dry, growing with or near bush, the fly is as plentiful as elsewhere. The author was impressed by the rarity with which this fly bit man, the preference for hippopotamus and crocodile being marked. *G. pallidipes* was found in two localities in dry thornbush along the river bank, and probably occurs elsewhere under similar conditions. *G. fusca* was found in dry, rather sparsely wooded country, except in one locality where it occurred in forest near the water. In discussing remedial measures the value of deforestation is pointed out. This method in conjunction with the destruction of breeding-places and trapping would not only lead to the extermination of the fly, but would at the same time open up large tracts for cultivation. The most fertile land in the Province is at present overgrown with bush, forest or papyrus.

CORNER (W.). **Malaria in the Kirkuk Division of Northern Mesopotamia during 1923.**—*Trans. R. Soc. Trop. Med. & Hyg.*, xix, no. 1–2, pp. 41–69, 2 maps, numerous charts. London, July 1925.

There are two definite malaria seasons in Kirkuk, one in the summer and a minor one in the autumn. Detailed observations on Anophelines could not be carried out, but it was taken for granted that the main carrier is *Anopheles superpictus* (*palestinensis*) as established by Christophers and Shortt [*R.A.E.*, B, ix, 159].

There appears to be a definite relation between the general increase of mosquito breeding and the increase of malaria. During October, mosquitos were even more abundant than during May, but the proportion of Anophelines seemed to be smaller. The summer malaria season lasts roughly from the beginning of June to the middle of August and is caused mainly by malignant tertian, benign tertian also occurring. Malignant tertian was predominant in late October and November. During the first five months of the year there was a marked prevalence of quartan malaria, presumably due to residual infections. A feature of the main malaria season was the fact that it lasted throughout the hottest and driest month of the year, when the 8 a.m. mean temperature was about 90° F. and the mean relative humidity was below 30 per cent. Humidity, within limits, appeared to be a factor of comparatively little importance in influencing malarial prevalence.

SWYNNERTON (C. F. M.). **The Evidence as regards the Game in the Outbreak of Human Trypanosomiasis near Mwanza.**—*Trans. R. Soc. Trop. Med. & Hyg.*, xix, no. 1–2, pp. 70–80. London, July 1925.

In this criticism of the points raised in Dr. Davey's paper [*R.A.E.*, B, xii, 118], the author further discusses various points in connection

with the Mwanza outbreak of sleeping sickness [*R.A.E.*, B, xi, 52]. The following is taken mainly from his summary :—No fresh light has been thrown on the origin of the outbreak, but the evidence available is to the effect that it is of recent occurrence. Cyclical infection appears likely to have occurred in some cases, but even in them it seems probable that the flies were infected from man, and the importance of man in this connection is considered to have been greatly underestimated.

Though it may be proved that infection with *Trypanosoma rhodesiense* is derivable from the game, the only evidence at present in favour of this theory is that originally afforded by the similarity in the trypanosomes. It is considered that far too little is made of Taute's striking experiments on man [*R.A.E.*, B, i, 178; viii, 46], and there has been such continuous movement of people between the infected and uninfected areas during and since the war that it will not be surprising if many cases and outbreaks of man-introduced infection are found.

Although the control of particular game animals may be necessary and useful as one of a combination of localised measures, wholesale game extermination is considered impracticable nearly everywhere.

Taute (M.). **Zur Bekämpfung der Tsetse-Fliege.** [The Control of the Tsetse Fly.]—*Der Tropenpflanzer*, xxviii, no. 4, pp. 169–174. Berlin, July-August 1925.

This paper discusses with approval the recent work by Swynnerton [*R.A.E.*, B, xiii, 114, etc.] on tsetse-fly problems, and supports his view that the wholesale destruction of game is neither necessary nor likely to prove successful.

Brumpt (E.). **The Prophylaxis of Sleeping Sickness.**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 13, p. 256. London, 1st July 1925.

The author emphasises the importance of the study of the various epidemiological elements during at least a whole year in a determined region before the initiation of measures against sleeping sickness. For instance, the method of combating *Glossina morsitans* in savannahs by bush fires differs naturally from that for *Glossina palpalis* in forest glades, to which it is impossible to set fire before cutting trees. The principal administrative measures to be taken are detailed.

Tsetse Fly Conference.—*Rhodesia Agric. Jl.*, xxii, nos. 3 & 4, pp. 317–318, 436. Salisbury, June & July 1925.

At a meeting convened in April for the purpose of discussing the spread of tsetse-fly [*Glossina morsitans*], more particularly in the Lomagundi district of Southern Rhodesia, the incidence of the fly was discussed from the veterinary, entomological and medical points of view, the close association of fly with game and foliage being generally emphasised. Mr. Jack stated that experience had shown that the destruction of game was practically an impossible task.

The possibility of creating a fly-proof barrier in the affected area by clearing a belt that the fly could not cross was discussed, and a resolution was passed to the effect that the Government should be asked to go into this aspect of the question as soon as possible.

Lal (R. B.) & Tiwari (C. D.). **A Note on the Disinfestation of Houses by Fumigation with Cresol.**—*Indian Med. Gaz.*, lx, no. 6, pp. 255–258. Calcutta, June 1925.

Experiments carried out to test the value of cresol as a fumigant for fleas are described. Though the fumigation has no effect on the rats, it is definitely toxic to fleas in muslin bags, free in the room or on the bodies of rats, but furniture and rat-runs form effective protection even when the fumigant is used in large quantities. The toxic action is more manifest at higher levels than at the floor level. Slightly better results are obtained by vapourising the cresol on two heaps of cow-dung cakes instead of on one. It was found that the quantity (2 oz.) previously recommended [*R.A.E.*, B, iii, 84] was inadequate for rooms of 1,000 to 1,500 cu. ft. In an ordinary room of 1,000 cu. ft. capacity 10 oz. of cresol should be used, and, if possible, some mechanical device should be adopted to prevent the vapour from rising directly upwards. The room should be carefully sealed before fumigation and be kept closed for four hours afterwards. After fumigation the floor should be washed with carbolic acid.

The Insect Menace.—*Indian Med. Gaz.*, lx, no. 6, pp. 276–282. Calcutta, June 1925.

In connection with the Indian Science Congress held at Benares, a joint meeting was held of the Medical Research, Agricultural, Zoological and Botanical Societies, and a combined discussion took place on the subject of insects and their relation to diseases in man, animals and plants. The text or an abstract of the speeches at the discussion is given.

Mr. T. B. Fletcher discussed the importance of entomology in India and gave a rough idea of the enormous losses sustained annually as a result of insect depredations and insect-borne diseases. He called attention to the importance and economy of organising a central entomological institute with an efficient staff to deal with both pure and applied problems.

Mr. S. K. Sen indicated the present position with regard to the important insect-borne diseases due to protozoan and other parasites and bacteria, and pointed out that, owing to the great difficulty of accurately identifying the lower organisms, the occurrence in the alimentary tracts or the tissues of insects, of parasitic bodies suspected to be the developmental forms of known pathogenic organisms can only be of very limited value as a factor in the elucidation of the aetiology of a disease. The part played by any insect in the propagation of a disease can only be demonstrated by experimental transmission. In this connection it is very desirable to standardise the technique employed in transmission work.

In a paper, "Man, *Anopheles*, and the Malaria Parasite in Relation to the Faunas," Col. S. R. Christophers pointed out that the Anophelines conform very markedly to the general distribution of

animals as worked out mainly in regard to the mammals. The appropriate groups of Anophelines may be regarded as integral portions of the great world faunas [*R.A.E.*, B, xiii, 109].

Sinton (J. A.) & Little (C. J. H.). **The Occurrence of *Culicoides* as an Ectoparasite of Anophelines.**—*Jl. R.A.M.C.*, xlv, no. 1, pp. 45–47. London, July 1925.

Culicoides anophelis, Edw., is recorded as attacking *Anopheles fuliginosus*, Giles (*jamesi*, List.) in the Central Provinces, this being apparently the first record from that part of India. There is no evidence at present that *C. anophelis* bites man, but if it should do so, the possibility arises of it becoming at least a potential mechanical carrier of malaria.

Reynolds (D.). **Disinfestation of Rooms by Formalin Vapour.**—*Jl. R.A.M.C.*, xlv, no. 1, pp. 48–51. London, July 1925.

The disinfestation of buildings infested with *Cimex lectularius* has always been difficult, as the eggs are resistant to the disinfectants in common use. In the present trials calcium chloride (20 per cent. quick lime, 80 per cent. bleaching powder) and formalin were used in equal parts. Seven rooms were treated, and it has proved a reliable and safe substitute for hydrocanic acid gas, provided that certain conditions are observed. The formalin is placed in a galvanised iron pail, and the calcium chloride, wrapped in thin paper, which is then pierced, is quickly added. Violent chemical reaction takes place immediately, and about 80 per cent. of the formalin is vaporised by the heat generated in the primary reaction. The treatment is most effective at a temperature of 70° F., with an atmospheric moisture of 70 per cent. As the gas evolved is slightly denser than air and does not diffuse very readily, the container should be placed as high up in the room as possible. A minimum of 2 pints of formalin and 2 lb. of calcium chloride are required for every 1,000 cu. ft. of space. The room should be closed for at least 24 hours, and not opened without a gas mask. The formalin should be placed in more than one container, but when large quantities are used, as much as 2 pints may be placed in each bucket.

Low (N.). **Anti-malarial Work in Ismailia.**—*Jl. R.A.M.C.*, xlv, no. 1, pp. 52–54, 1 fig. London, July 1925.

During 1923 both *Anopheles multicolor* and *A. pharoensis* were abundant, and many primary cases of malaria were recorded. During 1924, though *A. pharoensis* was still abundant, *A. multicolor* could not be found, and up to September no primary cases of malaria had occurred. During strong winds, *A. pharoensis* was always prevalent in the camp, the invasion arising from the marshes about 5 miles distant. Though this species can convey malaria under laboratory conditions, it did not do so at Ismailia. In "The Official History of the War," Hygiene ii, p. 209, *A. pharoensis* is stated to be the common carrier of malaria in Egypt, but the malaria rate is surprisingly small, considering that this mosquito abounds in most stations. If it is so occasional a carrier as to be practically innocuous, it is possible that a great deal of anti-mosquito work might be saved.

[Nikanorov (S. M.).] **Никаноров (О. М.). Суслики-хранители и передатчики чумной заразы.** [Ground-squirrels as Harbourers and Transmitters of Plague Infection.]—**Калмыцкая Область** [*Kalmyk Region*], 1925, no. 1, separate 16 pp., 1 map, 2 charts. Astrakhan, 1925.

There are two species of ground-squirrels inhabiting the south-east of European Russia, *Citellus fulvus* living in the sandy areas and *C. musicus mugosauricus*, which is abundant in the steppe region. These species apparently constitute the main reservoir of plague in this part of Russia. Their distribution and habits are discussed, and details are given of observations on their relation to plague. The disease is apparently transmitted directly from animal to animal and also by fleas. The latter method is the more important both as regards animal infections and transmission to man.

Pemberton (C. E.). **The Field Rat in Hawaii and its Control.**—*Hawaiian Sugar Planters' Assoc. Expt. Sta.*, Ent. Ser. Bull. 17, 46 pp. Honolulu, June 1925.

Conditions during 1923 and 1924 are discussed [*R.A.E.*, B, xiii, 86]. No rat-flea [*Xenopsylla*] was ever found on a dog or cat. The species taken on dogs were *Pulex irritans*, L., *Ctenocephalus felis*, Bch., and *Echidnophaga gallinacea*, Westw., and on cats, *C. felis* and *E. gallinacea*. Only one species of rat-flea has been taken from rats in Hawaii, this being the true plague flea, *Xenopsylla cheopis*, Roths. One individual of this flea was taken from a mongoose. The mouse flea, *Leptopsylla* (*Ctenopsyllus*) *musculi*, Dugés, is common on mice. Fleas are not common on rats except during dry periods, but a blood-sucking mite, *Laelaps* sp., is nearly always present. Wet conditions are known to be highly unfavourable to flea development, owing mostly to mortality among the eggs and larvae in wet soil, and data compiled by the Territorial Board of Health show that the occurrence of rodent plague in Hawaii is correlated with the records of rainfall.

Dick (R.). **The Epidemiology and Administrative Control of Anterior Poliomyelitis.**—*Med. Jl. Australia*, i, no. 21, pp. 536–541, 5 figs. Sydney, 23rd May 1925.

In the course of this paper the question of insect transmission is briefly dealt with. So far no definite insect has been found to be implicated, and natural transmission by stable flies [*Stomoxys*] is considered unlikely. Should rats be shown to be able to act as a reservoir of the virus, transmission by fleas or as a result of contamination of food will have to be considered. The administrative control in Australia requires amongst other measures that all flies be kept away from the patient or his discharges.

Pierantoni (U.). **Flebotomi italiani.** [Italian Sandflies.]—*Boll. Mus. Zool. & Anat. comp. Univ. Torino*, xxxix (1924), N.S. no. 21, 8 pp., 2 figs. Turin, 1925.

The species recorded from the neighbourhood of Naples are *Phlebotomus papatasii*, Scop., *P. minutus*, Rond., var. *meridionalis*, n., *P. perniciosus*, Newst., and *P. grassii*, sp. n. Both the new forms were taken on the walls of dwellings.

KRAUSSE (A.). **Eine neue Trombidiiden-Gattung von der Insel Elba.** [A new Genus of Trombidiid Mites from Elba.]—*Boll. Mus. Zool. & Anat. comp. Univ. Torino*, xxxix (1924), N.S. no. 28, 3 pp., 3 figs. Turin, 1925.

A new Trombidiid mite, *Monotrombium geisleri*, gen. et sp. n., is described from the island of Elba.

TOLDT, Jun. (K.). **Ein vermutlicher Herd von Menschen befallenden Milben bei Wien.** [A supposed Centre near Vienna of Man-infesting Mites.]—*Wiener klin. Wochenschr.*, xxxviii, no. 21, reprint, 5 pp. Vienna, 1925.

This is a record of the suspected infestation of man near Vienna by mites believed to be *Leptus autumnalis*, Shaw, attacks by which have already been noticed from Tyrol [*R.A.E.*, B, xii, 51].

WALCH (E. W.). **On the Trombiculae, Carriers of Pseudotyphus, and related Species from Sumatra (2nd Part).**—*Kitasato Arch. Expt. Med.*, vi, no. 3, pp. 235–257, 2 pls. Tokyo, 14th June 1925.

Two new Trombidiid mites, which are described from the larvae, *Trombicula keukenschrijveri* and *T. rara*, were both found on man. Of the species dealt with in the author's previous paper [*R.A.E.*, B, xi, 134], the nymphs of *T. pseudoakamushi*, *T. schuffneri*, *T. deliensis*, *T. muris*, and *T. oudemansi* have been reared and are here described. It has since been proved that *T. deliensis* is a carrier of pseudotyphus and that *T. schuffneri*, though not belonging to the tsutsugamushi group, can also carry the virus. *T. oudemansi* has also been taken on man on one occasion.

DONATIEN (A.). **Les piroplasmoses bovines en Algérie.**—*Rev. vét.*, lxxvii, no. 8, pp. 473–483, 4 figs. Toulouse, August 1925.

The contents of this paper on the forms of cattle piroplasmosis in Algeria have been previously noticed from another and fuller source [*R.A.E.*, B, xii, 104].

[PAVLOVSKI (E. N.).] PAWLOWSKY (E. N.) & STEIN (A. K.). **Experimentelle Untersuchungen über die Wirkung der Flöhe auf den Menschen.** [Experimental Researches on the Action of Fleas on Man.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, no. 8, pp. 387–400, 4 figs. Leipzig, 1st August 1925.

This paper has already been noticed from the Russian [*R.A.E.*, B, xiii, 12].

RICHARDSON (W. T.). **The Stickfast Flea and its Control.**—*Jl. Dept. Agric. W. Australia*, ii (2nd Ser.), no. 2, pp. 209–210. Perth, W.A., June 1925.

Against the stickfast flea [*Echidnophaga gallinacea*, Westw.] cementing floors of fowl-houses has been found to be the most efficacious and lasting measure and therefore the cheapest.

MARTINI (E.). **Ueber die Wärmesummenregel.** [On Formulae for Temperature Effects.]—*Zeitschr. angew. Ent.*, xi, no. 2, pp. 301–305, 2 curves. Berlin, July 1925.

After a brief criticism of certain details in Bodenheimer's paper [*R.A.E.*, B, xiii, 33] the author discusses Blunck's corrected formula for indicating the effect of temperature on insect development and describes other forms of curves and formulae that may be used. He concludes that Blunck's improvement represents a great advance, as has been confirmed by Bodenheimer [*R.A.E.*, A, xiii, 389], and is suitable for most practical workers.

COLCORD (M.). **Index III to the Literature of American Economic Entomology, 1920 to 1924.**—*Amer. Assoc. Econ. Ent.*, Spec. Pubn. 3, x+441 pp. Melrose Highlands, Mass., 1925. Price $6.50.

This volume, arranged on similar lines to that for the previous five years [*R.A.E.*, A, ix, 396], is improved by marginal indications as to new species, bibliographies, illustrations, and approved common names, and by the omission of the less important references to a given insect or topic.

DINGLER (M.). **Die Hausinsekten und ihre Bekämpfung.** [Household Insects and their Control.]—96 pp., 64 figs. Berlin, Paul Parey, 1925. Price 2 *Mks.*

This is a popular account of the principal noxious insects that may occur in dwelling houses in Germany, with notes on their control.

RÉTHLY (A.). **Les calamités naturelles en Hongrie de 930 à 1876.**—*Matériaux Etude des Calamités*, i, no. 4, pp. 373–378; ii, no. 5, pp. 77–87. Geneva, 1925.

This is a chronological and classified list of natural disasters that have occurred in Hungary during the period from 930 to 1876 A.D., including outbreaks of the Goloubatz fly [*Simulium columbaczense*] and plague.

BRITTAIN (W. H.). **Experiments in the Control of Head Lice** (*Lipeurus heterographus* **Nitzsch**) **on Young Chicks, 1924.**—*Proc. Acadian Ent. Soc. 1924*, no. 10, pp. 41–42. Truro, N.S., May 1925.

The following materials used against *Lipeurus heterographus*, Nitz., on young chickens showed complete control:—Derris 1 part, vaseline 3 parts; sodium fluoride (dry method) pure; sodium fluoride (dip) 1 oz., water 1 gal.; derris (dry method) pure; tobacco dust (dry method) pure; and derris 1 oz., calcium caseinate 1 gram, water 8 gals. For the liquid treatments the birds were rapidly immersed in the fluid and the feathers ruffled; in the dry treatments a pinch of each material was used, while in the case of the ointment a small amount was rubbed into the feathers. None of the treatments was in any way injurious to the birds.

D'Emmerez de Charmoy (D.). **La chique des poules** (*Sarcopsylla gallinacea*).—*Rev. agric. de l'Ile Maurice*, no. 19, pp. 381–382. Mauritius, January–February, 1925.

A recent proclamation by the Mauritius Department of Agriculture regulating the importation of animals, is shown to be justified by an example of the introduction of *Echidnophaga* (*Sarcopsylla*) *gallinacea*, Westw., on poultry from South Africa. In view of the possibility of future introductions, an account is given of the bionomics of this flea and of the usual measures against it.

D'Emmerez de Charmoy (D.). **La tique des oiseaux de basse cour,** *Argas persicus*.—*Rev. agric. de l'Ile Maurice*, no. 20, pp. 412–413. Mauritius, March–April 1925.

In view of the importance of *Argas persicus*, Oken (poultry tick) as a poultry pest and as the carrier of avian spirochaetosis, a brief account is given of its life and habits, and the advisability of taking every precaution against its entry into Mauritius is pointed out. It is suggested that birds from infested countries should only be allowed entry in special cages, and that these should be placed in quarantine for at least two weeks.

Ivanov (E.). **Le sort des trypanosomes** (*T. brucei* **et** *T. pecaudi*) **dans la cavité générale de** *Galleria mellonella*.—*C.R. Soc. Biol.*, xciii, no. 27, pp. 571–572. Paris, 14th August 1925.

The blood of larvae of *Galleria mellonella* infected with *Trypanosoma pecaudi* and kept for 20 hours at a temperature of 37–39° C. [98·6–102·2° F.] no longer showed the presence of trypanosomes and did not produce any infection when injected into mice. When kept in the larvae at laboratory temperature, active trypanosomes were found even after 6 days, and on injection into the abdominal region of a mouse they generally proved fatal. Similar results were obtained with *T. brucei*, except that it was difficult to detect the trypanosomes at the end of 2 or 3 days, though the virulence of the blood persisted even after 6 days. Infected larvae can complete their development and give rise to ovipositing females, though their progeny has not been observed. The passage of the trypanosomes through the body of the larvae eventually increases their virulence to mice [*cf. R.A.E.*, B, xiii, 117].

Chigasaki (J.). **Sur l'immunisation de** *Galleria* **aux différents stades de sa vie.**—*C.R. Soc. Biol.*, xciii, no. 27, pp. 573–574. Paris, 14th August 1925.

Further experiments with *Galleria mellonella* infected with the microbe of Danysz [*R.A.E.*, B, xiii, 136] show that it is readily immunised in the larval, pupal and adult stages against this infection, and that immunity obtained in the larval stage is transmitted to the pupa and adult.

Selivanov (E.). **Le virus du typhus exanthématique dans l'organisme des Oiseaux.**—*C.R. Soc. Biol.*, xciii, no. 27, pp. 664–666. Paris, 14th August 1925.

The virus of typhus introduced into birds remains active and may be inoculated into other animals; its virulence is, however, greatly reduced, and lice [*Pediculus*] are less easily artificially infected with it.

Sambon (L. W.). *Gongylonema.*—*Jl. Trop. Med. & Hyg.*, xxviii, no. 17, pp. 313–316, 2 figs. London, 1st September 1925.

The author has continued his study of *Gongylonema* in connection with diseases affecting man, particularly cancer [*R.A.E.*, B, xii, 128; xiii, 58], and has worked partly in association with Dr. Baylis [see next paper]. He is inclined to agree with the latter regarding the synonymy of *G. pulchrum* (*scutatum*, *ransomi*), infesting sheep, cattle, etc., though no doubt differences in hosts may determine certain adaptations in the size and shape of the parasite. *G. neoplasticum* (the parasite of rats), however, shows differences that appear of specific value. The work of other authors in classifying *Gongylonema* is discussed.

Baylis (H. A.). **Some Notes on Nematode Parasites found by Dr. Wassink in Rats and Mice.**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 17, pp. 316–317. London, 1st September 1925.

The author discusses observations made by Dr. W. F. Wassink in 1916, and has made a further study of some of the material used by him. A number of cockroaches (*Blatta orientalis* and *Blattella* (*Blatta*) *germanica*) obtained from various localities in Amsterdam, including a bakery and a sugar-refinery, were found to be free from larvae of *Gongylonema*, but in cockroaches from another sugar-refinery, about 1 in 7 of *B. orientalis* and *Periplaneta americana* were found to contain *G. neoplasticum*. No rats were known to occur in this refinery, but 6 out of 10 mice caught in it were found to harbour *Gongylonema*, and rats were infected experimentally by feeding them on some of the cockroaches. Individuals of *P. americana* from Surinam were found to contain larvae of *Gongylonema*; it is not known whether larvae were present in cockroaches on ships from South America, but they were not found in those on ships from the East Indies. Another worm, *Hepaticola hepatica*, although usually found in the liver of rats, was observed to be present occasionally in the anterior portion of the stomach.

The author discusses the identity of species of *Gongylonema*, and considers that *G. neoplasticum* of rodents and *G. pulchrum* of other hosts are probably specifically distinct.

Saunders (L. G.). **On the Life History, Morphology and Systematic Position of *Apelma* Kieff. and *Thyridomyia* n.g. (Diptera, Nemat. Ceratopogoninae).**—*Parasitology*, xvii, no. 3, pp. 252–277, 1 pl., 9 figs. Cambridge, August 1925.

During 1923 the author found larvae of 5 distinct species of *Apelma* living in terrestrial Bromeliaceae of the genus *Aechmea* growing on

rocks and islands in Brazil ; these are *A. edwardsi*, sp. n., *A. bromelicola*, Lutz, *A. keilini*, sp. n., *A. magna*, sp. n., and another species of which only the early stages are described. The immature forms of *Apelma* are strictly aquatic. The larvae are notably flattened dorso-ventrally, enabling them to exist in the capillary water between the closely appressed leaves of the plants. The females of the genus show a sexual dimorphism in view of which Kieffer's generic diagnosis can only apply to the males.

Thyridomyia palustris, gen. et sp. n., was bred from many larvae and pupae taken in a swampy wood in Cambridgeshire ; and *Atrichopogon frutetorum*, Winn., is referred to this genus. As a result of the study of these newly discovered early stages the author gives his reasons for not regarding *Apelma* as a synonym of *Forcipomyia*, and also for erecting the new genus.

Cameron (A. E.). **Studies on the Bionomics of Mange Mites of Cattle.**—*Parasitology*, xvii, no. 3, pp. 278–283. Cambridge, August 1925.

The author's summary of this paper is as follows :— Infection experiments with *Sarcoptes* of cattle conducted upon a horse, sheep, rabbits, rats, a cat, and man gave negative results. Active stages of the mite kept damp in the refrigerator lived 11 days, at room-temperature 7 days, and at 37° C. [98·6° F.] 3 days, these being the maximum periods observed. Eggs kept 5 days and over in the refrigerator subsequently failed to hatch when warmed ; when kept at room-temperature they lived 16 days and hatched on being warmed ; at 37° C. they survived 7 days. Infection experiments with *Psoroptes* of cattle conducted upon one heifer and continued for 6 months (in which active stages, eggs and scabs were maintained in position on the animal) gave negative results. *Chorioptes* of cattle kept at room-temperature and protected from light survived 29 days.

Pillers (A. W. N.). *Cheiletiella parasitivorax* **Megnin, causing Lesions in the Domestic Rabbit.**— *Vet. Jl.*, lxxxi, no. 2, pp. 96–97, 1 fig. London, February 1925.

A case is recorded of an infestation in a donkey thought to be due to mange obtained from a rabbit in the same paddock. On examination, however, it was found that the rabbit harboured *Cheiletiella parasitivorax*, whereas the lesions on the donkey were due to *Haematopinus asini* (*macrocephalus*).

Pillers (A. W. N.). *Linguatula serrata*, **Frölich 1789, in the Nasal Cavity of a Bull Bitch.**— *Vet. Jl.*, lxxxi, no. 3, pp. 126–130, 2 figs. London, March 1925.

In the case described *Linguatula serrata* was removed from the nasal cavity of a dog in England. The systematic position of these parasites is discussed ; they are generally considered to be aberrant or degenerate Acarids.

PILLERS (A. W. N.). *Linguatula serrata,* **Frölich, in Bovine Mesenteric Lymphatic Glands. A Lesion of Interest to the Meat Inspector.**—*Vet. Jl.*, lxxxi, no. 9, pp. 444–447, 4 figs. London, September 1925.

The present paper deals with four cases of *Linguatula serrata* occurring in the mesenteric lymphatic glands in cattle. The lesions are liable to be mistaken for tuberculosis.

MILLER (A. E.). **Clover Mites and Chiggers.**—*Bimthly. Bull. Ohio Agric. Expt. Sta.*, x, no. 7, pp. 111–114. Wooster, Ohio, July-August 1925.

Trombicula tlalzahuatl, Murray (Mexican chigger mite), which is troublesome to man on account of its bite, is frequently found on small animal and reptile hosts and on insects. Snakes in particular are heavily infested, the mites being attached by hook-like structures between the scales, where they suck the blood of the host. After several weeks the mites drop off and bury themselves under loose soil or leaves. Successful rearings have been made only from snakes. One generation occurs in a year, although oviposition and hatching is so irregular that some larvae are still active at the approach of cold weather. The adults pass the winter in the loose soil under débris.

This is apparently the only Trombidiid attacking man in North America, and it never engorges completely, for it is generally killed by scratching. The larva cannot bore into the skin or burrow into flesh. Biting can be prevented by dusting the body with a mixture of equal parts of flowers of sulphur and talcum powder. Applications of ammonia, alcohol, iodine, weak carbolic acid or xylene will relieve the irritation caused by chigger infestation. The larvae can be destroyed in grass areas by applying flowers of sulphur at the rate of 50 lb. an acre.

COUTTS (J. D.). **Notes on African Coast Fever.**—*Rhodesia Agric. Jl.*, xxii, no. 5, pp. 600–602. Salisbury, August 1925.

The essential factors in dealing with an outbreak of African coast fever are the early recognition of the disease and the existence of a dipping tank on the farm at the time of the outbreak. The respective merits of the three- and five-day interval dipping are discussed, showing that the adverse effect on cattle of short interval dipping and the benefits derived from the extension to the five-day interval are probably not so great as is supposed. Seven-day dipping, if properly carried out, is the best prophylactic measure; though it will not prevent the introduction or spread of the disease, it reduces the risk and mortality.

KO (R.). **On the Colour-preferences of Mosquitos.**—*Jl. Formosan Med. Soc.*, no. 244. Taihoku, Formosa, 1925. (In Japanese.)

Experiments in the colour-preferences of mosquitos are described. Pieces of coloured cloth and gauze were fixed to ceilings at definite intervals and 14,896 mosquitos were collected on them, most of which were species of *Culex*. *Anopheles* and *Armigeres* (*Desvoidya*) preferred yellow, white, deep red and green to blue, purple, red and black. On the other hand, in *Culex* and *Aëdes* (*Stegomyia*) this preference is reversed.

[Kolosov (Yu.).] **Колосов (Ю.). Нахождение *Mansonia richiardii* Ficalbi на Среднем Урале (Diptera, Culicidae.).** [The Occurrence of *Taeniorhynchus richiardii* in the Central Ural.]—**Извест. Энт. и Фитопатолог. Бюро Уральск. О-ва Любит. Естествозн.** [*Bull. Ent. & Phytopath. Bur. Ural Soc. Nat.*], 1925, no. 1, p. 7. Sverdlovsk, March 1925.

Taeniorhynchus (*Mansonia*) *richiardii*, Fic., is recorded from the Ural. It has apparently so far only been known from southern Europe.

[Kolosov (Yu.).] **Колосов (Ю.). Кровь сосущие комары окрестностей Свердловска.** [Blood-sucking Mosquitos from the Environs of Sverdlovsk.]—**Извест. Энт. и Фитопатолог. Бюро Уральск. О-ва Любит. Естествозн.** [*Bull. Ent. & Phytopath. Bur. Ural Soc. Nat.*], 1925, no. 2, pp. 3–4. Sverdlovsk, April 1925.

Brief notes are given on the seasonal occurrence of the following mosquitos from the Central Ural:—*Anopheles maculipennis*, Mg. (*claviger*, auct.), the only malaria carrier found within a radius of just over 13 miles of Sverdlovsk; *Culex pipens*, L.; *Theobaldia alaskaensis*, Ludl.; *T. fumipennis*, Steph.; *T.* (*Culicella*) *morsitans*, Theo.; *Aëdes dorsalis*, Mg.; *A. excrucians*, Wlk.; *A. cataphylla*, Dyar; and *A. vexans*, Mg.

[Kolosov (Yu.).] **Колосов (Ю.). К паразитологии домашних животных среднего Урала.** [On the Parasitology of Domestic Animals in the Central Ural.]—**Извест. Энт. и Фитопатолог. Бюро Уральск. О-ва Любит. Естествозн.** [*Bull. Ent. & Phytopath. Bur. Ural Soc. Nat.*], 1925, no. 2, p. 5. Sverdlovsk, April 1925.

The ectoparasites of domestic animals occurring in the Central Ural have so far been entirely neglected. An examination of specimens in the museum shows the Hippoboscid, *Melophagus ovinus*, L., and the louse, *Linognathus ovillus*, Neum., to occur on sheep.

Haslam (J. F. C.). **Observations on the Experimental Use of Fish indigenous to British Guiana for the control of Mosquitoes breeding in Vats, Tanks, Barrels and other Water Containers.**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 15, pp. 284–288. London, 1st August 1925.

As the practice is fairly common in British Guiana of keeping one or more fish (nearly always *Hoplosternum littorale*) in water receptacles, a study has been made of the various indigenous fish that might be of value in mosquito control. The mosquitos found breeding in the water receptacles were *Aëdes argenteus* (*Stegomyia fasciata*) and *Culex fatigans* with, occasionally, *Anopheles tarsimaculatus*. The trials with the various fish are described and the results tabulated. Silverbait (species of *Tetragonopterus*, *Charax* and *Hemigrammus*), *Hoplosternum littorale*, and *Cichlasoma bimaculatum* appear to be of the greatest value in this respect. For the smaller domestic water-containers silverbait are particularly useful, especially as they are able to live in water without the presence of mosquito larvae; for large vats or tanks the other species are more suitable. The advantages and disadvantages of each are briefly discussed.

Foley (H.), Catanei (A.), Brouard (M.) & Demimuid (P.). **Parasitisme et réactions morbides dans le paludisme chronique des enfants indigènes en Algérie.**—*Bull. Soc. Path. exot.*, xviii, no. 7, pp. 546–554. Paris, 1925.

In the course of this study on the epidemiology of malaria in Algeria it is stated that in the Tell *Plasmodium praecox*, *P. vivax* and *P. malariae* occur either isolated or in association, the last two being the most commonly associated. The most usual vector is *Anopheles maculipennis*. In the oasis of Beni-Ounif de Figuig, only *P. vivax* and *P. praecox* are found, frequently in association. *A. multicolor* is the vector of malaria throughout the Algerian Sahara.

Charrier (H.). **Remarques au sujet du paludisme à Tanger durant ces vingt dernières années.**—*Bull. Soc. Path. exot.*, xviii, no. 7, pp. 558–569, 1 map, 2 graphs. Paris, 1925.

From medical statistics compiled during the last four years, it is evident that malaria is increasing at Tangier as a result of the extension of the town towards Anopheline breeding-places. Meteorological conditions evidently play an important part in the incidence of malaria; above all, rain is a principal factor; a fairly rainy spring followed by moderate rain in autumn nearly always produces a large number of malaria cases.

Bauvallet (H.). **Quatre mois de campagne antimurine (septembre à décembre 1924) à Cotonou (Dahomey).**—*Bull. Soc. Path. exot.*, xviii, no. 7, pp. 596–600. Paris, 1925.

The organisation of a campaign against rats at Kotonu (Dahomey) during an epidemic of bubonic plague at Lagos (Nigeria) is described. Among the rats destroyed were *Mus rattus*, *M. norvegicus* (*decumanus*) and *Cricetomys gambianus*, *M. rattus* being always by far the most numerous. Of the fleas found on these, *X*[*enopsylla*] *cheopis* was in the great majority, with *C*[*eratophyllus*] *fasciatus*, *P*[*ulex*] *irritans*, *C*[*tenocephalus*] *canis* and *C. felis* (in the order of their abundance) much more rare. Traps that caught the rats alive were considered by far the best, as with others (such as the break-back variety) the rats were collected some time after death, when the fleas they harboured had probably already abandoned them.

[Tarnogradski (D. A.).] **Тарноградский (Д. А.). К зимовке комаров (Culicidae) в г. Владикавказе и его окрестностях.** [The Hibernation of Mosquitos in the town of Vladikavkaz and its Environs.]—*Trav. Sta. biol. Caucase du Nord, Gorsky Inst. agron.*, i, pt. 1, pp. 28–35. Vladikavkaz, 1925. (With a Summary in French.)

As a result of the observations described it is considered doubtful whether Anophelines could hibernate as larvae in the district of the Caucasus under review. The adults of *Anopheles maculipennis* appear to be more resistant to sudden drops in temperature than those of *Culex pipiens*. *A. maculipennis* does not occur during the winter in its summer hiding places, such as stables and cowsheds, but is found in

cold, fairly well lighted rooms above ground as near as possible to its breeding-places. *C. pipiens* prefers underground, quiet, warm places. As the number of hibernating Anophelines is very low, and their breeding-places are fairly limited, there is every reason to hope for successful control of malaria. *A. maculipennis* was first noticed at the beginning of March, the temperature ranging from 7·2 to 19·5° C. [about 44·6–67° F.].

[Tarnogradski (D. A.).] **Тарноградский (Д. А.). Заметки к биологии малярийного комара.** [Notes on the Biology of Mosquitos.]—*Trav. Sta. biol. Caucase du Nord, Gorsky Inst. agron.*, i, pt. 1, pp. 39–41. Vladikavkaz, 1925. (With a Summary in French.)

Notes are given on the distribution of *Anopheles maculipennis* in the Caucasus. Many of its breeding-places were heavily overgrown with *Chara*.

[Vasilev (I. V.).] **Васильев (И. В.). К биологии и экологии обыкновенного малярийного комара** (*Anopheles maculipennis* **Meign.**). [On the Biology and Ecology of the common Malaria Mosquito, *A. maculipennis*.]—**Профилактическая Медицина** [*Prophylactic Medicine*], 1925, no. 2, separate 8 pp. Kharkov, 1925.

These observations on the life-history of *Anopheles maculipennis*, Mg., were carried out in the Kharkov Government, where there are apparently 5 generations a year. The maximum flight of these generations occurred at the beginning and end of June, middle of July, middle of September and beginning of October respectively. The first adults were taken on 17th May and the last on 28th October. The various breeding-places are described; the waters devoid of larvae invariably belonged to one of the four following groups: those very shaded, surrounded by tall trees and therefore deprived of aquatic vegetation; those having a dense cover of *Lemna minor* and *L. polyrrhiza* on the surface; those polluted with rubbish (crude oil, manure, etc.); and temporary pools that dry out by the middle of May or earlier. Where *Naias major* covered the river beds no larvae were found, this plant apparently being noxious to them. Hibernation occurs in the adult and larval stages.

Young (W. A.). **Gold Coast: Report on Tsetse Fly and Trypanosomiasis 7th January 1925.**—6 pp. Received from the Colonial Office, 10th July 1925.

Sleeping sickness is undoubtedly chronic in Ashanti; and probably many cases of spontaneous recovery occur. The topography of the country covered during the present investigations is described. In the rainy season *Glossina palpalis* was found wherever there was a running shaded stream. The breeding period is presumably restricted, and many of the pupae perish as they are dropped on unsuitable soil, such as hard sand. The human food supply is so plentiful that this fly does not require to seek other sources; no reptilian blood was ever found in it. *G. longipalpis* occurred more frequently along the roads. A few individuals of *G. medicorum* and *G. tachinoides* were also found. Except for *T*[*rypanosoma*] *gambiense* found in the gut of one *G. palpalis*, the

gut trypanosomes were all of the *T. congolense* type, as were those that occurred in the proboscis and hypopharynx. They occurred in *G. palpalis* and *G. longipalpis*.

PATTON (W. S.). **Diptera of Medical and Veterinary Importance, I. Types of older Authors in Continental Museums.**—*Philippine Jl. Sci.*, xxvii, no. 2, pp. 177–200. Manila, June 1925.

This paper is the record of a tour on the Continent to study the identity of Diptera of medical and veterinary importance in various private and public collections, including that of many of the species described by older authors.

The places and collections visited were the Fabrician collection of Diptera at the Zoological Institute of Kiel University ; the Fabrician, and Westermann and Trentepohl collections at the Zoological Museum of Copenhagen University ; the types of Thomson and those of Speiser (Sjöstedt's Kilimandjaro Expedition) in the Natural History Museum at Stockholm ; the collections in the Zoological Museum of the University at Berlin, which contain valuable types and specimens determined by Loew, Karsch, Grünberg, Enderlein and others ; the collections and types of von Winthem, Wiedemann, Schiner, Doleschall, and Brauer at the Vienna Zoological Museum ; the National Hungarian Museum at Budapest ; Bezzi's collection at Turin ; Macquart's collection and that of the testaceous CALLIPHORINAE studied by Surcouf, at the Natural History Museum at Paris ; the types of Villeneuve, Wiedemann and Macquart at Rambouillet ; and Walker's and Bigot's types in London.

A list is given of the 45 species of *Musca* known to the author at present, with synonyms and notes on the species. As regards other genera, *Bdellolarynx* is treated as a synonym of *Haematobia, H. nudinervis*, Stein, having priority over *H. sanguinolentus*, Aust. *Glossinella shillingsi* is considered to be a species of *Lyperosia* probably *L. minuta*, Bezzi. Other new synonymy includes *Stomoxys nigra*, Macq. (*glauca*, Grünb.), *Oestrus* (*Gasterophilus*) *intestinalis*, DeG. *lativentris*, Lw.) and *O.* (*G.*) *veterinus*, Clark (*nigricornis*, Lw.).

MACDOUGALL (R. S.). **Insect Pests of 1924.**—*Trans. Highland & Agric. Soc. Scotland*, 1925, reprint, 27 pp., 37 figs. [Edinburgh] 1925.

Warble-flies (*Hypoderma*) were less injurious to cattle during 1924 than in the previous year [*R.A.E.*, B, xiii, 98], owing to the weather conditions being unfavourable to them. Further promising experiments have been made with dressings of nicotine sulphate in combination with lime. Larvae of *Oedemagena tarandi* were taken from the back of a reindeer in the Zoological Gardens, Edinburgh ; this fly is a native of Lapland and North America. In view of the recent mention of cockroaches as possible disseminators of cancer and other diseases, their life-history and recent measures for their control are reviewed.

Theobaldia annulata is recorded from Perthshire as biting during the night in early March.

DETJENS (B.). **Die Schäden der Dasselfliege.** [Losses due to the Warble Fly.]—*Badische Bl. für Schädlingsbekämpf.*, i, no. 5, pp. 65–67. Freiburg i. Br., June 1925.

The annual losses in Germany due to warble flies [*Hypoderma*] infesting cattle are estimated to be £150,000–£200,000.

BEDFORD (G. A. H.). **The Sheep Nasal-fly** (*Oestrus ovis*, **Linné**).—*Jl. Dept. Agric. Union S. Africa*, xi, no. 2, pp. 119–123, 3 figs. Pretoria, August 1925.

Cephalomyia (*Oestrus*) *ovis*, L., is a common pest in Europe, America, Australia and South Africa, and is known to occur in other parts of Africa and Asia. In the larval stage it lives in the nasal cavity of sheep, and has also been recorded from goats and various deer. In South Africa the flies may be present from the beginning of September to May, but are seldom seen as they are very rapid fliers. They deposit their eggs or living young at the entrance of the nostrils of the host. The young larvae crawl to the nasal sinuses or even to the base of the horns, in horned rams and goats, where they attach themselves by hooks to the mucous membranes. Occasionally they may migrate to the cranial cavity and turbinate bones, where they may become imprisoned and die. Larvae in different stages may be found on the same host; if very numerous, they may cause its death. The larvae usually live in the host 8 to 10 months, but may only take 6 months to mature. They crawl out or are expelled by a violent fit of sneezing. They either burrow into the ground or crawl into a sheltered place for pupation. During the summer months the pupal stage lasts from 21 to 28 days, but should the larvae leave the host in June or July pupation lasts from 49 to 66 days or more according to temperature conditions.

Various substances such as snuff or pepper may be blown into the nostrils of the animal to induce violent sneezing to expel the larvae, but most remedies of this kind are troublesome and may set up irritation causing considerable harm to the animals. Good results are stated to have been obtained by injecting mercury bichloride, 1 in 1,000 parts of water, up each nostril, the operation being repeated 3 or 4 times at intervals of a few days. The best preventive method and the one usually adopted is to provide the sheep with salt troughs smeared with tar. As they lick the salt the tar adheres to their noses and repels the flies. These troughs should be used from September to May. Infested sheep should be isolated on hard ground where the larvae as they emerge can be collected and destroyed. [*Cf. R.A.E.*, B, ix, 183.]

PURI (I. M.). **A Note on the Early Stages of a Species of** *Simulium* **from Tunis,** *S. equinum* **var.** *mediterraneum*, **nov. (Diptera, Simuliidae).**—*Ann. & Mag. Nat. Hist.*, xvi, no. 92, pp. 253–255, 1 fig. London, August 1925.

Owing to the distinct and constant differences observed in the early stages of *Simulium equinum* from Tunis as compared with those found in Great Britain and the colder regions of Europe, the species occurring along the Mediterranean is considered to be a new variety, and is described as *S. equinum* var. *mediterraneum*.

WAGNER (W.). **Beiträge zur Biologie der Kriebelmücke.** [Contribution to the Biology of Simuliids.]—*Zool. Anz.*, lxiii, no. 7–8, pp. 195–208, 3 figs. Leipzig, 20th July 1925.

The eggs, generally 300–500, of the first generation of Simuliids are deposited in May and June on grasses, plants and stones in water, preferably in a strong current. The larvae hatch in 8–10 days and are full grown in about 9 weeks, the pupal stage lasting about 14 days.

(K2786) Wt P7/D23 1,500 11/25 H & Sp Gp 52

The adults of this brood appear about the middle of August and lay the eggs from which the hibernating larvae hatch. There are seldom more than the two generations a year.

Cattle and horses are attacked by these flies chiefly on sultry days, in sheltered spots, after sunrise, and at sunset. In the Erft district, as a preventive, airy sheds facing north are used, since the flies dislike the dark and wind. The animals are rubbed with asafœtida. Since the most dangerous part of the year is until 10th May, attacks on cattle can be lessened by driving the animals to pasture only at night. The autumn generation of the flies is apparently harmless. The species of Simuliids found by the author in the Erft district are *Simulium* (*Odagmia*) *angustimanus*, *S.* (*O.*) *ornatum*, *S.* (*Wilhelmia*) *equinum*, and *S. equinum* var. *annulitibia*.

Collet (—). **Un procédé de destruction des mouches adultes.**— *Bull. Soc. Médico-Chirurgicale*, 1924. (Abstr. in *Bull. écon. Indochine*, xxviii, Renseignements, April 1925, pp. [190–191]. Hanoi, 30th June 1925.

As the bodies of adult flies [*Musca domestica*] are covered with a wax that protects them from ordinary liquids but is soluble in hydrocarbides, they may be destroyed by spraying with a Vermorel pump emitting a mist-spray of hydrocarbide, in places where they collect in numbers. When hit by the spray they fall down and can be swept up. In such places as stables, where there is nothing to injure, crude coal-tar oil can be used for this purpose, diluting it with a little paraffin if it is not sufficiently liquid; for interiors of houses, etc., benzolene is better. In this case, care must be taken about fire, and rooms should be ventilated for an hour before use. If rooms can be left for a week without occupation, paraffin can be used; the danger of fire is then much less and after a week the odour and any stains made by the oil will have disappeared. Very little is required; for a large farm 2 gallons are sufficient. When coal-tar oil is sprayed upwards, it is well to protect the head and body as there are certain caustic products of phenol present. The tubing of the Vermorel pump should not be of plain rubber, but of treated material like the feed tube of aeroplane motors. The air compressor should be of the pump type, which is not touched by the liquid, and the spray should be regulated to the finest mist possible.

Johnston (T. H.). **Remarks on the commoner "Bushflies" of Australia.**—*Health*, iii, no. 4, pp. 110–113. Melbourne, July 1925.

Much of the information in this paper has already been noticed [*R.A.E.*, B, x, 14, 15]. *Musca pumila* (*vetustissima*) and *M. convexifrons* (*fergusoni*) readily settle on human beings and thus may frequently be the carriers of organisms producing such diseases as typhoid, dysentery, etc. They are by no means restricted to the bush, but are abundant in the streets of Australian towns. Studies of the life-histories of these flies are described, the total period from oviposition to the emergence of the adult of *M. pumila* being 11 to 13 days in spring and early summer, and probably much less in midsummer and early autumn. The flies become very abundant in the hotter parts of the country soon after the commencement of the summer rains,

the moist conditions probably encouraging emergence from numbers of pupae in the ground or in sheltered positions. The numbers decrease again as cold, dry weather advances. Until more is known regarding the breeding habits of bush-flies, remedial measures (as apart from the precautionary measures of protecting food and individuals from attack) cannot be satisfactorily formulated. Chalcids and large wasps destroy considerable numbers.

Bishopp (F. C.). **Flytraps and their Operation.**—*U.S. Dept. Agric.*, Farmers' Bull. 734, 14 pp., 7 figs. Washington, D.C., revised July 1925.

This is a revision of a previous edition, the bulk of the information having already been noticed [*R.A.E.*, B, iv, 181 ; ix, 158]. Additional information is given on the construction of an all-metal fly-trap.

Dunn (M. B.). **Methods of Protection from Mosquitoes, Black-flies and similar Pests in the Forest.**—*Canada Dept. Agric.*, Pamphlet N.S. no. 55, 11 pp., 3 figs. Ottawa, July 1925.

A general account is given of the mosquitos, Simuliids, and other blood-sucking Diptera attacking man in forests, the periods of their greatest abundance and their habitats. The protective measures described include proper location of camp, and the use of suitable clothing, mosquito nets and fly-proof tents, smudges and repellents, formulae for which are given.

Goodwin (H.). **Report on the General Health of the Stock of Antigua for the Year ending 31st March 1925.**—Fol., 6 pp. Antigua, 1925.

Of the specific, semi-specific, and accidental myiasis-producing flies of human beings and animals, the following have been found in Antigua : *Oestrus* (*Gastrophilus*) *intestinalis* (*equi*), *O.* (*G.*) *nasalis*, *Cephalomyia* (*Oestrus*) *ovis*, *Calliphora vomitoria*, *Cochliomyia macellaria*, *Lucilia sericata*, *Sarcophaga plinthopyga*, *Eristalis vinetorum* and *Fannia* spp. The introduction of *Hypoderma bovis* has been prevented by careful inspection of imported cattle before and some time after landing. The fly-borne Nematodes, *Habronema megastoma H. microstoma*, and *H. muscae*, are all present on the Island.

Patton (W. S.). **Diptera of Medical and Veterinary Importance, II. The more important Blowflies, Calliphorinae.**—*Philippine Jl. Sci.*, xxvii, no. 3, pp. 397–411. Manila, July 1925.

This continuation of a previous paper [*R.A.E.*, B, xiii, 162] deals with the genera *Calliphora*, *Lucilia*, and *Chrysomyia*. The new species described are *Calliphora hilli*, *Lucilia fergusoni*, which may possibly prove to be a sheep-maggot fly, *Chrysomyia fulvipes*, and *C. annulipes*, all from Australia.

Ferris (G. F.). **Third Report upon Diptera Pupipara from the Philippine Islands.**—*Philippine Jl. Sci.*, xxvii, no. 3, pp. 413–421, 5 figs. Manila, July 1925.

Anatomical and biological details are given of *Cyclopodia horsfieldi*, de Meij., *Lynchia maura*, Big., and *Ornitheza metallica*, Schiner.

Cotte (J.) & Tian (A.). **Observations sur le métabolisme de la Mouche domestique** (*Musca domestica* **L.**).—*Soc. Biol., Réunion plénière 1924*, pp. 193–196, 1 fig. Paris, 1924. [Received 30th September 1925.]

The effects of various factors such as nutrition, temperature, etc., on the basal metabolism of *Musca domestica*, L., are discussed.

Isaac (P. V.). **Papers on Indian Tabanidae, IV-VII.**—*Mem. Dept. Agric. India*, Ent. Ser. viii, no. 10, pp. 93–109, 5 pls., 7 figs. Calcutta, April 1925. [Received 14th September 1925.]

These four short papers deal with the head and mouth-parts of the larva of *Tabanus rubidus*, Wied. ; the male and female genitalia of *T. tenens*, Wlk. ; the mechanism of suction in the larvae of this species ; and the life-history of *T. striatus*, F. (*hilaris*, Wlk., *partitus*, Wlk.). The last-named is one of the commonest Tabanids on the plains of India and is abundant during certain months at Pusa, where three broods occur. It feeds on the blood of cattle.

Senior-White (R.). **New Ceylon Diptera, Part IV.**—*Spolia Zeylanica*, xiii, pt. 2, pp. 209–212, 1 pl. Colombo, 31st July 1925.

The Tabanid, *Haematopota ricardonis*, sp. n., taken on cattle, and the Sarcophagid, *Sarcophaga talonata*, sp. n., are described.

Senior-White (R.). **Notes on Ceylon Mosquitos, I.**—*Spolia Zeylanica*, xiii, pt. 2, pp. 213–222, 2 pls. Colombo, 31st July 1925.

A key is given to the larvae of the Anophelines of Ceylon, with notes on many of the species. The larvae of *Anopheles jamesi*, Theo., and of the Culicine, *Ficalbia luzonensis*, Ludl., which was collected in a rice field, are described. Additional Anophelines to those previously recorded [*R.A.E.*, B, xiii, 121] are *A. asiaticus*, Leic., *A. jeyporensis*, Theo., and *A. maculipalpis*, Giles. It is also possible that *A. culiciformis*, Cogill, *A. lindesayi*, Giles, and *A. ludlowi*, Theo., occur in Ceylon.

Sack (P.). **Die Zweiflügler des Urwaldes von Bialowies.** [Diptera of the Virgin Forest of Bialowies.]—*Abhandl. math.-naturw. Abt. bayer. Akad. Wissensch.*, Suppmt., v, no. 6–9, pp. 259–277. Munich, 1925.

This list includes records of *Anopheles maculipennis*, Meig., *Culex pipiens*, L., six species of *Aëdes*, two of *Theobaldia*, and 17 species of Tabanids.

[Shtakelberg (A. A.).] **Штакельберг (А. А.). Материалы для определения кровососущих двукрылых С.С.С.Р., I. Род** *Anopheles*. [Materials for the Identification of Blood-sucking Diptera of U.S.S.R., I. Genus *Anopheles*.]—*Rev. Microbiol. & Epidemiol.*, iv, pt. 2, pp. 20–42, 5 figs. Saratov, 1925. (With Summary in English, pp. 110–111.)

This paper is intended as the first of a series of keys for the identification of blood-sucking Diptera of European and Asiatic Russia. It

embraces the Palaearctic representatives of the genus *Anopheles* in the broad sense. Brief descriptions of the species are given, with notes on the synonymy and distribution. Previous work on the subject has been used to a certain extent, particularly with reference to the keys, which are largely identical with those of Edwards [*R.A.E.*, B, x, 18].

[Popov (P. P.).] **Попов (П.П.). Обнаружение *Phlebotomus caucasicus* Marzinowsky 1917 в Туркестане, Афганистане и Бухаре и о различиях между ним и *Phlebotomus sergenti* Parrot, 1917.** [The Discovery of *P. caucasicus*, Marz., 1917, in Turkestan, Afghanistan and Bokhara and the Difference between it and *P. sergenti*, Parrot, 1917.]—*Rev. Microbiol. & Epidemiol.*, iv, pt. 2, pp. 88–96, 1 pl. Saratov, 1925. (With Summary in English, pp. 117–118.)

The author has examined a number of examples of *Phlebotomus* from Transcaucasia, Turkestan, Bokhara and Afghanistan, which are identical with *P. caucasicus*, Marz. The male is redescribed. The author does not consider this species to be a synonym of *P. sergenti*, Parr. [*cf. R.A.E.*, B, ix, 43], the differences between the two being pointed out.

Hargreaves (H.). **Annual Report of the Government Entomologist.**—*Uganda : Ann. Rept. Dept. Agric. 1924*, pp. 21–28. Entebbe, 1925.

Taeniorhyncus fuscopennatus, Theo., is the predominant mosquito breeding in the swamps in the vicinity of Entebbe ; these are too extensive and too thickly grown with papyrus to be drained or treated effectively with larvicides.

Various substances of an oily nature were tested as deterrents for *Simulium damnosum*, Theo. Vaseline was highly satisfactory, but " cotton-seed tar " produced locally as a waste product in gas-producing plants of ginneries proved the cheapest, costing about 1s per gallon, and was equally effective.

S. damnosum is particularly prevalent where dense vegetation affords shelter from wind. In addition to man, it also feeds on game and birds, and although apparently present throughout the year, is most prevalent in January, the driest month. Rapid, well aërated water is essential for its propagation ; the eggs, larvae and pupae are found on submerged rocks and aquatic plants in the rapids of the Nile, being absent in smoother water. No suitable breeding-place other than the Nile seems to exist in the Jinja area, the inference being that the flies travel great distances in pursuit of food. They are most active on hot, bright days, but shelter in the grass or other vegetation during the hottest hours. Septic sores often result from their bites. The volume of water in the rapids is too great to treat with larvicides at the source of the Nile, and the erection of a dam at the lower limit of the rapids, by which the level of the water might be periodically lowered and the immature stages killed by desiccation, while offering a possibility of eradication, would involve a large expenditure of money.

Couvy (—). **Le fonctionnement du service de défense contre le paludisme à Madagascar (1923-1924).**—*Ann. Méd. & Pharm. colon.*, xxiii, no. 2, pp. 238–264. Paris, May-August 1925.

A general account is given of the conditions in various districts in Madagascar with regard to the incidence of malaria and the possibilities of its control. The factors favouring the breeding of mosquitos are discussed ; rice-fields are an important one. The Anophelines recorded are *Anopheles* (*Myzorhynchus*) *mauritianus*, Grp., *A.* (*Myzomyia*) *funestus*, Giles, *A.* (*Cellia*) *squamosus*, Theo., and *A.* (*C.*) *pharoensis*, Theo. The last two occur throughout the year in the vicinity of Antananarivo. The most important time of hatching is, however, the beginning of December. Individuals taken in January already showed a high sporozoite index (25 per cent.). The expenditure necessary for the control of the breeding-places is too great to be embodied in the usual budget, but it is to be considered as one of the major projects to be undertaken for the development of the colony. Pending the organisation of this work, anti-larval measures and general quinine prophylaxis are being carried out. The death rate in certain districts has been reduced by 35 per cent. in 1924, as compared with 1923. These figures are for the four months, March to June, in which malaria is most prevalent.

Leger (M.). **Le paludisme au Sénégal et en particulier à Dakar ; ses origines, les remèdes possibles.**—*Ann. Méd. & Pharm. colon.*, xxiii, no. 2, pp. 265–278. Paris, May–August 1925.

This is a review of the conditions in Senegal with reference to the incidence of malaria and the possibility of its control. The three Anophelines occurring at Dakar are *Anopheles* (*Pyretophorus*) *costalis*, Theo., *A.* (*Myzomyia*) *funestus*, Giles, and *A.* (*Cellia*) *pharoensis*, Theo.

Instruction pratique pour la lutte contre le paludisme.—*Ann. Méd. & Pharm. colon.*, xxiii, no. 2, pp. 343–346. Paris, May-August 1925.

These recommendations for measures against malaria have already been noticed from another source [*R.A.E.*, B, xiii, 88].

Dyar (H. G.). **The Mosquitoes of Panama (Diptera, Culicidae).**—*Insecutor Inscitiae Menstruus*, xiii, no. 7–9, pp. 101–195. Washington, D.C., September 1925.

This is a revision of a previous list of mosquitos from Panama [*R.A.E.*, B, xii, 38] and includes keys to the genera and species. Some 20 species not yet recorded from Panama, but which seem likely to occur there, are included. *Deinocerites monospathus*, sp. n., is described from the Canal Zone. A new subgenus, *Conopostegus*, is erected for *Aëdes leucocelaenus*, Dyar & Shannon.

Goetghebuer (M.). **Catalogue raisonné des Culicides de Belgique.**—*Bull. & Ann. Soc. ent. Belg.*, lxv, pt. 7, pp. 209–219. Brussels, 31st July 1925.

This list of the mosquitos of Belgium gives notes on their distribution and synonymy, with keys to some of the genera and species. The Anophelines are represented by *Anopheles maculipennis*, Mg., and

A. bifurcatus, L. *A. plumbeus*, Hal., occurs along all the frontiers, but has not been found within the country. It is suggested that *A. bifurcatus* is the carrier of malaria in Belgium, as it bites man much more readily than does *A. maculipennis*; it has not, however, been taken in human dwellings.

Informe de las labores desempeñadas por el personal de la Sección de enfermedades tropicales durante los meses de enero a marzo 1925. [Report on the Work of the Staff of the Section for Tropical Diseases in the Period January–March 1925.]—*Bol. Dept. Salubridad publica*, no. 1, pp. 95–125, 3 fig. Mexico, D.F., 1925.

The work done by the Department of Public Health, Mexico, included a mosquito survey in the Federal District surrounding the metropolis. The species found were *Culex tarsalis*, Coq., *C. fatigans*, Wied. (*quinquefasciatus*, Say), *Theobaldia* (*Culiseta*) *inornata*, Will., and *Anopheles quadrimaculatus*, Say.

Brumpt (E.). **Etude d'une petite épidémie de paludisme contracté " en plein air " dans la région du Lac Rodolphe.**—*Ann. Parasit. hum. & comp.*, iii, no. 4, pp. 370–374, 3 figs. Paris, October 1925.

In view of the opinion held by some workers that malaria cannot be contracted in the open, an account is given of an expedition in a sparsely populated part of Abyssinia in 1902, in the course of which a number of persons contracted the disease, though they only sheltered in tents struck almost daily, and never slept in huts.

Gaupillat (M.) & Neveux (—). **Existence d'un foyer autochtone de piroplasmose équine à *Piroplasma caballi* en Haute-Marne.**—*Ann. Parasit. hum. & comp.*, iii, no. 4, pp. 375–383, 1 fig. Paris, October 1925.

Piroplasma caballi has been isolated from horses in the Haute-Marne. Seven cases are described. *Dermacentor reticulatus*, F., was found both on the diseased and healthy horses; the same tick also occurred on dogs.

Mandoul (A. H.). **A propos de l'acare de la gale norvégienne.**—*Ann. Parasit. hum. & comp.*, iii, no. 4, pp. 394–395. Paris, October 1925.

In spite of the diversity of opinion as to the causal agent of Norwegian crusted scabies, a case recorded from Bordeaux would appear to prove conclusively that common scabies and Norwegian scabies are both caused by the same mite, *Sarcoptes scabiei hominis*, the Norwegian variety of the disease differing merely in the form of the lesions caused [*cf. R.A.E.*, B, ix, 148].

Brumpt (E.). **Ponte et résistance des oeufs de l'*Anopheles maculipennis*.**—*Ann. Parasit. hum. & comp.*, iii, no. 4, pp. 396–402, 3 figs. Paris, October 1925.

A detailed description is given of the act of oviposition in *Anopheles maculipennis*, Mg. With regard to the resistance of the eggs to

desiccation, it was found that if placed on blotting paper immediately after being laid, they survived for 48 hours exposed to the air, and 72 hours if in a medium of saturated humidity, at temperatures of 12°–15° C. [53·6°–59° F.]. Eggs that are about to hatch will survive 6 days in a damp atmosphere at these temperatures. The author's observations do not favour the hypothesis that, in warm climates, *A. maculipennis* may hibernate in the egg-stage [*R.A.E.*, B, xiii, 138]. A method of observing the hatching of the eggs is described.

As a result of observations made in Normandy and near Paris, the author is disinclined to believe in the possibility of preventing mosquitos from feeding on man by supplying them with ample food such as domestic animals [*R.A.E.*, B, viii, 141]. All female individuals taken from stables, etc., were found readily to attack man.

BRUMPT (E.). **Capture des larves de Culicidés par les plantes du genre *Utricularia*.**—*Ann. Parasit. hum. & comp.*, iii, no. 4, pp. 403–411, 3 figs. Paris, October 1925.

The work of previous authors on the subject of the destruction by plants, such as the different species of *Utricularia*, of various types of insects is reviewed [*cf. R.A.E.*, B, xii, 178]. The capture of mosquito larvae by the "bladders" of this plant was confirmed by the author experimentally with *U. vulgaris* gathered in the neighbourhood of Paris, in the case of *Anopheles maculipennis* and *Culex apicalis*. Further knowledge of the conditions necessary for the establishment of these plants for the purpose of mosquito destruction is therefore desirable.

LANGERON (M.). **Biologie et écologie des Utriculaires dans leurs rapports avec la prophylaxie du paludisme.**—*Ann. Parasit. hum. & comp.*, iii, no. 4, pp. 412–425, 4 figs. Paris, October 1925.

The biology of various species of *Utricularia* is discussed with special reference to the part they play in mosquito control, the aquatic forms alone being regarded as worthy of consideration. As little is known of the function of the "bladder" of these plants, it is not possible to confirm the opinion of earlier authors that they serve mainly as traps, the penetration of insects being possibly accidental and even detrimental to the plant.

A list is appended of the aquatic species of *Utricularia* with their places of origin.

RUMBALL (P.). **The Poultry Tick.**—*Queensland Agric. Jl.*, xxiv, pt. 2, pp. 134–137, 5 figs. Brisbane, 1st August 1925.

A brief account is given of the life-history of *Argas persicus*, Oken, attacking fowls in Queensland. Spraying with kerosene emulsion is recommended for infested poultry houses. The spray should be used freely, three applications at intervals of 5 days being the minimum advised.

Noble (C.). **Annual Report of the Director of Agriculture for 1924.**— 17 pp. Nicosia, Cyprus, 1925.

Although most parts of Cyprus are heavily infested with ticks that have not yet been identified, no tick-borne diseases had been recognised there in previous years. A few cases of equine and bovine piroplasmosis were, however, observed in 1924, and a considerable number of cases of piroplasmosis in sheep and goats.

Cantacuzène (J.). **Le problème de l'immunité chez les Invertébrés.**— *Soc. Biol., Célébration du 75me Anniv.*, pp. 48–119. Paris, 1923. [Received 14th September 1925.]

This is an extensive review of the question of immunity in invertebrates, and includes a very full bibliography.

Paillot (A.). **Les caractères de l'immunité chez les Insectes.**—*Soc. Biol., Célébration du 75me Anniv.*, pp. 130–132. Paris, 1923. [Received 14th September 1925.]

The author briefly summarises his previous work on immunity in insects and points out that the reactions to microbic infection (chiefly humoral) are different from those that take place in vertebrates. In insects immunity may occur without phagocytosis ; humoral reaction may occur without the intervention of leucocyte products secreted during the course of infection ; and phagocytosis must be regarded as a physiological accident, resulting from the proximity of the phagocytes and microbes. The observations on which this conclusion is based are too numerous to be considered as exceptions to a general rule applicable to the whole animal kingdom, the existence of which, in insects, could only be partly proved. The need for a thorough study of immunity in all branches of zoology is, therefore, urged.

McCulloch (W. E.). **Relapsing Fever in Northern Nigeria—a Study of 300 Cases.**— *Jl. Trop. Med. & Hyg.*, xxviii, no. 18, pp. 332–341, 5 charts. London, 15th September 1925.

Recurrent fever appeared in the Kano Province of Northern Nigeria early in 1924 and quickly assumed serious proportions, spreading to other provinces. In the space of a year the deaths attributable to it have exceeded 5 per cent. of the total population. Spirochaetes were found in a small proportion of the lice (*Pediculus humanus*) examined ; this, together with the absence of *Ornithodorus moubata*, the non-pathogenicity of the spirochaete to guinea-pigs and the clinical course of the fever, indicates that the spirochaete is *Spirochaeta recurrentis* or a related strain rather than *S. duttoni* [*cf. R.A.E.*, B, xi, 213]. Although lice are abundant in most of the native houses, a number of cases of infection occurred in institutions where continued search revealed none ; *Cimex lectularius* was, however, present, and the author believes it to be a secondary transmitter of the spirochaete [*cf. R.A.E.*, B, x, 158], although examinations of bed-bugs have so far proved negative, except for the presence of a few unexplained granules. That

the epidemic was at its height during the coldest month of the year is explained by the fact that the internal temperature of the native houses was kept higher at this time than in the summer.

By March 1925 the epidemic was decreasing; the author regards this as being due partly to the immunisation of the survivors from an attack, and consequent drying up of the reservoirs of the virus; but still more to the immunising of children *in utero*. He discusses the general question of immunity; and considers that so-called "racial" immunity occurs only when a whole race lives in the same environment in relation to a particular disease.

SPAAR (E. C.). **Some Observations on the Common Endemic Fevers of Ceylon.**—*Jl. Trop. Med. & Hyg.*, xxviii, no. 19, pp. 349–352. London, 1st October 1925.

A review is given of the principal febrile diseases, mostly insect-borne, of which malaria is by far the most prevalent in Ceylon. Investigations are being carried out regarding the breeding grounds and species of Anophelines. The seasonal incidence of typhoid coincides with the height of the breeding season of *Musca domestica*, but it has greatly decreased since the sewage of Colombo has been water-borne. Dengue, which was first observed in the island in 1905, is very prevalent in the low-lying sea-coast towns during the south-west monsoon, from May to September, but it does not often occur inland. *Aëdes argenteus* (*Stegomyia fasciata*) is the only carrier. Yellow fever is unknown in the island, but as *A. argenteus* is very common in the sea-coast towns, there is always a possibility of its being introduced. Plague, the bubonic form of which is far the commoner, is endemic only in the Colombo area. The comparative immunity of the island from the disease in epidemic form is attributed to the fact that plague bacilli in the rat flea, *Xenopsylla astia*, rapidly disappear at temperatures above 85° F.; and this flea is said rarely to bite man at temperatures above 80°.

DRBOHLAV (J. J.). **Studies on the Relation of Insect Herpetomonad and Crithidial Flagellates to Leishmaniasis.—I. Inoculation of Mammals with Insect Flagellates.—II. The Specificity of the various Insect Flagellates for certain Hosts, as indicated by Cross Infection Experiments.—III. Cultivation Requirements.**—*Amer. Jl. Hyg.*, v, no. 5, pp. 580–621, 1 pl. Baltimore, Md., September 1925.

In view of the conflicting results recorded by different authors from attempts to infect vertebrates with insect flagellates, it was decided to reinvestigate the problem of the relation of the latter to leishmaniasis. A list of the species of *Herpetomonas* and *Crithidia* with their hosts is given; 96 species have been reported in insects and Arachnids. Lists are also given of the Herpetomonads reported from other invertebrates and from plants, as well as of the related flagellates reported from vertebrates. The work here described was begun in 1922 with *Herpetomonas ctenocephali* from *Ctenocephalus canis* (dog flea). As only negative results were obtained, *Crithidia gerridis* from the water-strider, *Gerris remigis*, was used in the spring of 1923 and later *Herpetomonas muscae-domesticae* (*muscarum*) from *Lucilia caesar*. The inoculation of these flagellates into laboratory animals was practically

a repetition of the work of the French and English authors. Plants were also inoculated. In none of the animals or plants was there any indication of multiplication of the flagellates within the body ; on the contrary, they diminished in numbers and disappeared after a few hours. The experiments indicate that there is no aetiological relationship between the three insect Herpetomonads mentioned above and leishmaniasis, and the results confirm those obtained by American and the majority of European investigators.

From the observations on the specificity of various insect flagellates to certain insect hosts it is concluded from cross-infection experiments that the flea, *Ctenocephalus canis*, may be artificially infected with its natural parasite, *Herpetomonas ctenocephali*, but not with *Leishmania infantum*, *H. muscae-domesticae* or *Crithidia gerridis*. Larvae of *Ctenocephalus canis* were artificially infected by feeding them with faeces of infected fleas and with cultures of *H. ctenocephali*. Since such larvae remained infected throughout the entire larval, pupal and adult states of development, it appears probable that the natural infection of fleas is acquired in the larval stage by feeding on infected faeces of adult fleas, and not in the adult stage, when only animal blood is taken as food. Attempts to infect flagellate-free *Gerris remigis* with *H. ctenocephali*, *H. muscae-domesticae* or *L. infantum*, proved unsuccessful. Attempts to infect flies by feeding them with *H. ctenocephali*, *L. infantum* and *Crithidia gerridis* failed. Cross-infection experiments carried out with cultures of *H. muscae-domesticae* on certain species of flies of the genera *Musca*, *Fannia* and *Lucilia* have furnished positive results, all serving as suitable hosts. This, in the absence of any other differential character, indicates that the flagellates described as different species from these various flies represent one and the same organism, and therefore the name *H. muscae-domesticae* should be applied to the Herpetomonads found in different species of flies [*cf. R.A.E.*, B, xii, 26].

DuPorte (E. M.). **Notes on the Endophytic Protozoa with a List of some Canadian Host Plants, and an Account of four apparently new Forms.**— *Jl. Parasit.*, xi, no. 4, pp. 183–194, 4 pls. Urbana, Ill., June 1925.

A list is given of 14 plants that harbour endophytic protozoa in Canada, and the organisms found in the latex of 4 species are described. These organisms survive the winter in the stems and roots of the plants, and become active with the growth of the host in the spring. The organisms found in *Convolvulus* and *Asclepias* may be transmitted through the seed. There has been no definite association of pathological conditions with the presence of these organisms.

The relation of insects to the endophytic protozoa is discussed. Saprophytic organisms must be continually ingested by insects feeding on solid substances or water, whereas Rhynchota, which obtain their food and water from the internal juices of plants and animals, are extremely unlikely to ingest foreign organisms except through the juices of the hosts. It is quite probable therefore that at least some of the endophytic protozoa may have originally invaded the latex of plants, and later become adapted to living in the tissues of the insects that feed on them.

YOKOGAWA (S.). **On a New Species of Nematode, *Gongylonema orientale*, found in Formosa.**—*Jl. Parasit.*, xi, no. 4, pp. 195–200, 1 pl. Urbana, Ill., June 1925.

Gongylonema orientale, sp. n., was found in the muscles of *Periplaneta americana*, L., and *P. australasiae*, F., and experiments in feeding rats on the infected cockroaches were carried out. This Nematode is parasitic in rats on the mucous membrane of the anterior portion of the digestive tract. As a result of their presence marked pathological changes are set up, similar to those caused by *G. neoplasticum*. Diffuse hypertrophy is followed by the formation of papilloma terminating in carcinoma.

BEQUAERT (J.). **The Arthropod Enemies of Mollusks, with Description of a New Dipterous Parasite from Brazil.**—*Jl. Parasit.*, xi, no. 4, pp. 201–212, 1 fig. Urbana, Ill., June 1925.

Previous work on the Arthropod enemies of molluscs, chiefly of snails, is reviewed, and the Sarcophagid, *Malacophagula neotropica*, gen. et sp. n., is described from the snail, *Bulimulus tenuissimus*, obtained in Brazil.

KINGHORN (A.). **Human Trypanosomiasis in the Luangwa Valley, Northern Rhodesia.**—*Ann. Trop. Med. & Parasit.*, xix, no. 3, pp. 281–300. Liverpool, 30th September 1925.

The physical aspects of the valley under consideration are described. Game is abundant, and may be found in close proximity to the villages in the dry season. Waterbuck and bushbuck amongst others were found to be infected with a trypanosome considered to be identical with *Trypanosoma rhodesiense*, and as the former antelopes are extremely plentiful in the immediate neighbourhood of certain villages that have suffered severely from sleeping sickness, there are grounds for regarding this particular animal with suspicion. *Glossina morsitans*, Westw., occurs throughout the whole area and shows much the same seasonal variation as the game. Owing to the fact that villages are, as a rule, built in clearings and are surrounded by gardens it is unusual for the fly to invade them.

The history of sleeping sickness in the valley is traced. Though scattered over the whole area, the number of cases found was small, showing that the infection displayed no tendency to assume epidemic proportions. The author does not consider the disease to be of recent introduction. The cases are not only found in widely separated villages, but they also usually occur singly, and those in the same village may be separated by an interval of years. This sporadic occurrence of the disease, observed since 1909, seems to be more easily explained by the theory that the human and game trypanosomes are one and the same parasite and that man is ordinarily resistant to infection by it, than by the theory that the human and game trypanosomes are distinct. Epidemics are largely due to the superimposition of the man-fly-man cycle of transmission of the parasite on the more ordinary game-fly-man cycle.

The disease in man and its treatment and prophylaxis are discussed.

ADLER (S.) & THEODOR (O.). **A Sporozoon of** *Phlebotomus papatasii*. —*Ann. Trop. Med. & Parasit.*, xix, no. 3, pp. 309–313, 12 figs. Liverpool, 30th September 1925.

This is the first record of oocysts in *Phlebotomus papatasii*, Scop.; they occurred in the thorax and abdomen and contained sporozoites apparently of the genus *Hepatozoon*. This type of Gregarine has up to the present only been recorded from mammals, except for two records from *Glossina palpalis*, R.–D., which point to its possible presence in lizards or birds that feed on the fly. Infection of a vertebrate host takes place by the ingestion of the transmitting Arthropod containing ripe oocysts, *e.g.*, *Mus rattus* becomes infected with *Hepatozoon perniciosum* by swallowing the mite, *Laelaps echidninus*, Berl., and dogs are infected with *H. canis* by swallowing the tick, *Rhipicephalus sanguineus*, Latr.

The example of *P. papatasii* concerned was a female collected among a number of others in Jericho. As it seemed obvious that the oocysts formed a part of the life-cycle of a haemogregarine of a vertebrate, experiments were made in which a preparation containing sporocysts and free sporozoites was injected intraperitoneally into two lizards. Some of the preparation was also rubbed into puncture wounds made by a needle into the forearms of two human beings. The results were negative in both cases.

ADLER (S.) & THEODOR (O.). **The Experimental Transmission of Cutaneous Leishmaniasis to Man from** *Phlebotomus papatasii*.—*Ann. Trop. Med. & Parasit.*, xix, no. 3, pp. 365–371. Liverpool, 30th September 1925.

Previous references to the implication of *Phlebotomus* in the transmission of oriental sore are reviewed. In Palestine, *P. papatasii*, Scop., would appear to be the carrier, as it is the only species common to the three localities where the disease occurs. The fact, however, that oriental sore is absent from many localities in Palestine where sandflies are a plague is rather against the theory that they transmit the disease. In Jerusalem itself up to the present no locally acquired cases have been recorded, though ideal conditions for the spread of the disease, such as the presence of *P. papatasii*, *P. perniciosus*, Newst., and *P. minutus*, Rond. (the last being rare), as well as a number of infected people from Jericho, Baghdad, Aleppo and Persia, apparently exist.

Experiments made with a number of *Phlebotomus* taken in Jericho in October showed the presence of *Herpetomonas* in the midgut of three females gorged with mammalian blood. All stages from non-flagellated to long-flagellated forms were noted. A method recommended for the examination of sandflies for *Herpetomonas* is described. From the end of December to the following April no sandflies could be found in Jericho. *P. papatasii* became numerous after 20th April, and *P. minutus* appeared towards the end of June. Of a number of *Phlebotomus* collected in June only one female *P. papatasii* was found to contain *Herpetomonas*, which were swarming in the whole of the alimentary tract. The insect contained no blood, and the abdominal cavity was full of ripe or almost ripe eggs. Flagellates were especially numerous in the upper part of the midgut, where they appeared to be attached to the posterior surface of the oesophageal valve. In view of the peristaltic action passing from the posterior end of the oesophageal

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diverticulum towards the oesophagus, it is possible that flagellates may be propelled into the pharynx and buccal cavity, thus allowing the possibility of direct transmission by the bite of the sandfly. Hitherto it has been generally considered that infection takes place only as a result of the crushing of infected *Phlebotomus*. The parasites observed were not polymorphic, but were all elongated and had long flagella. Some of the material was used for inoculating the forearm of a human being. Five days later a small papule, which would normally have passed unobserved, was found on one of the inoculated points, containing Leishman-Donovan bodies. The incubation period was thus considerably shorter than that noted by the Sergents and their collaborators [*R.A.E.*, B, x, 39]. Their experiments and those of the author prove that human beings can be infected with oriental sore by inoculation with *Herpetomonas* from *P. papatasii*, but the epidemiological evidence that this midge is the only carrier of the disease in nature is not yet complete. Moreover, it has been shown in the past [*cf. R.A.E.*, B, ii, 201 ; iii, 68 ; iv, 43] that successful infection with leishmaniform bodies may be produced in vertebrates by injecting species of *Herpetomonas* and *Crithidia* from various insects. The question of other insect carriers of oriental sore, apart from *P. papatasii*, can only be cleared up in future by direct experiments on man with flagellates from various insects.

YORKE (W.). **Co-ordination of Effort in Tsetse-fly Investigations.**—*Ann. Trop. Med. & Parasit.*, xix, no. 3, pp. 373–379. Liverpool, 30th September 1925.

In this paper, read at the Second Imperial Entomological Conference, after pointing out the many disadvantages resulting from lack of co-ordination in the past in connection with tsetse-fly investigations, the author urges that future work should be concentrated, and that the entomological, medical and veterinary research into the trypanosomiasis problem should be combined under one central organisation, to be supported by contributions from all the African Colonies concerned. The personnel of any investigating commission should be large enough to ensure continuity of work in all directions ; and sufficient funds should be placed at the disposal of these commissions to allow of the employment of adequate native labour to enable the investigation of the relationship of the fly and trypanosomiasis to game, and of the various problems enumerated in the report of the *Glossina* Sub-Committee of the Imperial Bureau of Entomology [*R.A.E.*, B, ix, 54] to be carried out in a satisfactory manner and with some reasonable prospect of success.

MEGAW (J. W. D.). **The Typhus-like Fevers.**—*Indian Med. Gaz.*, lx, no. 9, pp. 429–430. Calcutta, September 1925.

This is a brief review of the various typhus-like fevers occurring in different parts of the world. A striking feature of many records of these fevers, which are not likely to be carried by lice [*Pediculus*], is the fact that they are associated with conditions of the wilds and are, therefore, probably conveyed from an animal reservoir by ticks, mites or other Arthropods. Only the louse-typhus and tick-typhus have been proved to have an essentially similar pathology, so that the only justification for including the other typhus-like fevers in the same

group is practical convenience and expediency. It has the great advantage of calling the attention of workers to the clinical features and the possible vectors of the diseases.

PINTO (C.). **Ensaio monographico dos Reduvideos hematophagos ou "Barbeiros."** [A Monograph on the Blood-sucking Reduviids.] —8vo, vii+118 pp., 66 figs. Rio de Janeiro, 1925.

Information is given on the anatomy and biology of blood-sucking Reduviid bugs, and on laboratory methods for breeding them, with particulars of their various popular names (chiefly South American) and methods for their control and for the preservation of specimens. The evolutional forms of *Trypanosoma cruzi* found in these vectors are described. A discussion of the classification of these bugs (with keys to Brazilian and non-Brazilian species and a list, with synonymy, of the various species) is followed by lists showing their geographical distribution. There is an account of the habits of the Reduviids transmitting *T. cruzi*, and a list of the species found to be infected in nature. A bibliography of 135 references completes this comprehensive paper.

Rhodnius brumpti, sp. n., from Brazil, is described and figured.

VAN STEENIS (P. B.). **The Way in which Plague spreads over Java.**—*Geneesk. Tijdschr. Ned.-Indië*, lxv, no. 4, pp. 446–457. Batavia, 1925.

In this article, the text of which is in Dutch, the author discusses and criticises the arguments advanced by Otten [*R.A.E.*, B, xii, 48] in support of the view that plague in Java is carried by human agency and that rats harbouring *Pygiopsylla ahalae* are of little importance.

RICE (C. E.). **Destruction of Cockroaches and Devitalization of their Eggs by Cyanogen-chloride Mixture.**—*Public Health Repts.*, xl, no. 35, pp. 1808–1811. Washington, D.C., 28th August 1925.

Blattella germanica, L., is the most important cockroach infesting ships, though *Periplaneta americana*, L., and *P. australasiae*, F., are often found in ships touching at Central American ports and the South Sea Islands. The results of experiments with *B. germanica* show that under suitable conditions as to closing and sealing on board ship, cyanogen-chloride and hydrocyanic acid gas developed by 4 oz. sodium cyanide to each 1,000 cu. ft. in conjunction with 17 oz. hydrochloric acid, and 3 oz. sodium chlorate, with a two-hour exposure, will give complete control of cockroaches, if not too well protected. Doubling the time of exposure would increase the efficiency. The same gas and the same exposure will kill the eggs unless too well protected. If a second fumigation is carried out in order to kill the larvae that have hatched since the first fumigation, two weeks at least should elapse. Female cockroaches with egg-sacs attached were observed from August 1924 to February 1925 for the effect of this gas on the hatching of eggs, and only on rare occasions did eggs attached to dead cockroaches hatch.

Ewing (H. E.). U.S. Bur. Ent. **Two New Chiggers** (*Trombicula* **Larvae**).—*Proc. Ent. Soc. Wash.*, xxvii, no. 7, pp. 145–146. Washington, D.C., 1st October 1925.

The new Trombidiid mites described from the larvae are *Trombicula gymnodactyli* from a museum specimen of a gecko (*Gymnodactylus lawderanus*) collected in India in 1874, and *T. hylae* from tree toads (*Hyla arenicolor*) from California.

Hirst (S.). **The Adult Form of the "Harvest Bug."**—*Nature*, cxvi, no. 2921, p. 609. London, 24th October 1925.

The adult form of the larval mite, known as the "Harvest Bug," *Leptus autumnalis*, Shaw, has long been sought for. The author has succeeded in rearing an adult from the larvae of this mite found on chickens, and suggests the name *Trombicula* (*Neotrombicula* subgen. n.) *autumnalis*. The genus *Leptus* was created by Latreille for another mite, now referred to the family Erythraeidae, and should not be used for the "Harvest Bug," which belongs to the family Trombidiidae.

Crampton (G. C.). **The External Anatomy of the Head and Abdomen of the Roach,** *Periplaneta americana*.—*Psyche*, xxxii, no. 4–5, pp. 195–220, 3 pls. Boston, Mass., August–October 1925.

Periplaneta americana, L., has been chosen to illustrate the anatomy of a typical cockroach because of its size and relative abundance.

Herrick (G. W.). **Manual of Injurious Insects.**—8vo, xxi+489 pp., 458 figs. New York, Henry Holt & Co., 1925.

This book is intended to serve as a work of reference on the more common insect pests of the United States; the more general information contained in the opening chapters is, however, of wider application. Chapters are devoted to the systematic position, structure and transformations of insects, losses caused by insects, insects as disseminators of plant and animal diseases, useful insects, and insect control and insecticides. The last four chapters (51 pages) deal with Arthropods injurious to live-stock and poultry, insects injurious to the household, and poisonous Arthropods. Under each host is given a concise and practical account of its more important pests. The illustrations include a valuable series of over 100 maps, which show at a glance the distribution in North America of particular insects; five of these refer to pests of animals.

Narayan Rau (M. A.). *Haemogregarina canis*.—*Vet. Jl.*, lxxxi, no. 6, pp. 293–307, 2 pls., 1 fig. London, June 1925.

The cycle and stages of *Haemogregarina canis* in dogs and in the tick, *Rhipicephalus sanguineus*, are described from material obtained in Madras. The sporonts occurring encysted in leucocytes in the peripheral blood of the dog are ingested by the tick, and within about 12 hours give rise to vermicules in the gut contents. In 24 hours most of these have passed into the epithelial cells of the gut. In about 36 hours each of them begins to divide longitudinally into 2 (rarely 4), and these pass into the lumen of the gut and are the sexual stages.

Conjugation takes place in the gut contents, resulting in an " ookinete," which passes into a young cell of the gut, where it becomes an oocyst (sporocyst). The oocysts are plentiful within 48 hours of the beginning of engorgement by the tick. Being situated very near the lumen of the gut, they are able, in bursting, to discharge their sporozoites into the gut contents. The sporogony is completed in about 3 days. Partly engorged ticks removed from infected dogs were found to transmit the disease to uninfected dogs after 3 or 4 days' starvation. Emulsions of infected ticks also produced the disease in healthy dogs, although the peripheral blood of infected dogs (which only contained sporonts) inoculated into healthy dogs failed to produce the disease. The internal structure of the tick, which is briefly described, indicates that regurgitation of the contents of the gut is possible, and that it is in that way that infection is transmitted by the tick. It is presumed that partially engorged ticks, scratched off by infected dogs, complete their meal on other dogs, thus infecting them. The disease was found to be far more prevalent among ill-cared-for dogs than among those kept free from ticks. The schizogony of the parasite, which takes place in the spleen, bone-marrow, and liver, is described.

LECKIE (V. C.). **Some Notes on Surra in the Camel, its Treatment and Prevention.**— *Vet. Jl.*, lxxxi, nos. 6–8, 10, 11, pp. 281–292, 346–352, 398–404, 494–499, 546–553, 6 figs. London, June–November 1925.

The main object of this paper is to record the author's experience in the treatment of surra in camels in India with potassium antimony tartrate, as devised by Cross, and the discovery of the great value of sodium antimony tartrate for that purpose.

The only Arthropod vector of surra in which the causal agent, *Trypanosoma evansi*, is known to have a developmental cycle is the tick, *Ornithodorus crossi*, Brumpt [*R.A.E.*, B, x, 63], though several Tabanids have been proved to transmit the disease mechanically [*R.A.E.*, B, v, 38 ; xi, 116, 134, 216, 217]. *Stomoxys* [*calcitrans*, L.] and the camel louse have both been found to contain trypanosomes after feeding on surra-infected animals, but the lice, when allowed to feed on guineapigs, did not transmit the disease to them. In an outbreak of surra amongst fox-hounds at Lahore in 1923, fleas were suspected as the vectors, and no further cases occurred after the fleas had been exterminated in the kennels. The careless taking of blood-smears is a possible means of spreading surra from an infected to an uninfected animal, and birds which, like the Indian crow, will peck at a wound on an animal, may thus transmit the trypanosomes.

The measures to be taken to prevent the spread of surra include the elimination of camels that may act as reservoirs of the disease ; in this connection animals that have acquired a natural resistance to the trypanosomes are a probable source of danger often unsuspected. Camels should be kept, as far as possible, away from localities infested with Tabanids, which have increased in the camel-breeding area with the increase of irrigation. Where these flies are present, camels should be watered at places where there are few trees and little vegetation ; on the march they should be watered after sun-down. Swamps and pools in the breeding-places may be sprayed with paraffin, so that the Tabanids, in drinking, will be smeared with paraffin and

drowned. The author has never known mules to become infected with surra from camels, even when Tabanids have been numerous and have been seen feeding on the mules, and they may be immune from the camel type of *Trypanosoma evansi*. Smearing camels with repellents has not been found satisfactory [*R.A.E.*, B, vi, 109].

BEVAN (Ll. E. W.). **The Trypanosomiases of Man and Animals in Southern Rhodesia.**— *Vet. Jl.*, lxxxi, no. 11, pp. 536–546. London, November 1925.

This is a review of the facts respecting the forms of trypanosomiasis of man and animals occurring in Southern Rhodesia and their modes of transmission and treatment, with special reference to trypanosomiasis of cattle.

The Parasite *Linguatula taenioides*.—*Jl. Dept. Agric. Union S. Africa*, xi, no. 3, pp. 201–202, 1 fig. Pretoria, September 1925.

The endoparasitic Arachnid, *Linguatula taenioides*, occurs in the adult form in the nasal cavities of the dog. The ova are deposited in the cavities and are expelled by sneezing. If they fall on grass or forage, they remain there, and the mucus protects them for several weeks. If the grass harbouring eggs is eaten by any herbivorous animal, the embryos are released in the intestines of the new host. The young larva bores through the digestive canal until it reaches an organ, such as the mesenteric glands, liver or lungs, where it becomes encysted. After pupating, it transforms into a secondary larva, which migrates all over the body. Those in the lungs may be sneezed out, while those in other organs may be eaten by dogs (especially those kept by butchers). Any that can find their way to the nasal cavity of a dog transform there to the adult stage. The adults have also been found in human beings. Dogs should be kept away from the entrails of sheep or other animals that may contain the parasites.

WARBURTON (C.). **Report on Ixodidae of the Colombo Museum.**— *Spolia Zeylanica*, xiii, pt. 2, pp. 255–256. Colombo, 31st July 1925.

In this list of ticks from Ceylon, there are no Argasids, nor any representatives of the genera *Ixodes* or *Hyalomma*, though *H. aegyptium* is one of the commonest ticks in India.

Among those of special economic importance are *Boophilus annulatus australis* and *Rhipicephalus sanguineus*.

SCHWARTZ (B.) & CRAM (E. B.). **Horse Parasites collected in the Philippine Islands.**—*Philipp. Jl. Sci.*, xxvii, no. 4, pp. 495–505, 3 pls. Manila, August 1925.

The parasites of horses collected in the Philippines include the fly-borne Nematodes, *Habronema megastoma*, *H. microstoma*, and *H. muscae*.

Cosimo (B.). **Studien über Kieferzähne von *Anopheles*, herrührend aus verschiedenen Gegenden der Emilia und des Ferrareser Kreises.** [Studies on the Maxillary Teeth of *Anopheles* from various Localities of Emilia and of the Province of Ferrara.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 1, pp. 112–113. Leipzig, 1925.

Examinations of over 1,000 *Anopheles* [*maculipennis*] failed to disclose any recognisable differences in the maxillary indices of individuals captured in dwellings and in animal quarters. It is concluded that it is impossible to find an agreement between any differences in the maxillary index and differences in the epidemiological occurrence of malaria, and that the existence of a particular biological race of *A. maculipennis* is still too doubtful to be treated as an explanation of the occurrence of Anophelines without malaria.

Friederichs (K.). **Beobachtungen an Simuliiden in Ost-Java.** [Observations on Simuliids in East Java.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 1, pp. 119–125. Leipzig, 1925.

Simuliids do not appear to occur in the coastal districts, but were found at altitudes between 600 and 5,500 ft. and must certainly occur higher up. The three species noticed as bloodsuckers in East Java are *Simulium argyrocinctum*, Meij., *S. iridescens*, Meij., and *S. atratum*, Meij. Man is seldom, if ever, attacked. *S. argyrocinctum*, found at low and medium altitudes, feeds in the ears of cattle, buffalos and horses; in the dry season it can be very troublesome to cattle. In habits it resembles the European *S. equinum*, L. *S. iridescens*, although common up to the highest altitudes, was observed twice only feeding on various parts (not the ears) of cattle; in habits it resembles the European *S. argyreatum*, Mg. *S. atratum* was found once only, feeding on domestic fowls.

Galli-Valerio (B.). **Les causes de l'extinction de quelques foyers de malaria du nord de l'Italie et de la Suisse.**—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 1, pp. 126–134. Leipzig, 1925.

The foci of malarial infection in Switzerland and North Italy have been extinguished chiefly by the use of quinine, but this result has been greatly assisted by a reduction in the number of Anophelines. Roubaud's theory of the existence of Anophelines that do not bite man [*R.A.E.*, B, viii, 141; x, 53] cannot be supported, for the author has found that the Anophelines in the extinct foci examined by him bite man and transmit malaria. In none of these had changes occurred in the relations between man and cattle. Other causes that have contributed to the extinction of malaria are the cessation of an influx of infected persons and the improvement of social conditions.

Gosio (B.). **Ueber die Verbreitung der Bubonenpesterreger durch Insektenlarven.** [On the Spread of the Causal Agent of Bubonic Plague by Insect Larvae.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 1, pp. 134–139. Leipzig, 1925.

This is a preliminary report on a study by the author in collaboration with G. Alessandrini and C. Russo on the fate of bubonic plague bacilli ingested by insect larvae that habitually feed on the dead

bodies of infected animals. Attention has not been drawn hitherto to insects that become infected in this manner. The larvae of *Musca domestica*, *Calliphora vomitoria* and *Cochliomyia* (*Lucilia*) *macellaria*, when fed on highly-infected livers and spleens of rats or guineapigs that had died of plague, completed their development normally. They harboured numerous types of plague bacilli, especially in the mid-gut, and their excreta contained these organisms. Fewer bacilli are found prior to pupation, but small numbers persist in the pupae. The adults appear to be quite normal for a short period after emergence, but subsequently larger numbers of plague bacilli may occur in them than in the later larval stages and in the pupae. Under these circumstances they may die in 15–24 hours, especially at high temperatures. Control flies lived up to a week. Medical literature often mentions a heavy mortality among flies during a plague epidemic, and Jersin attributed this to the plague bacilli. The adult fly can also acquire infection direct, but, as a rule, infection may be traced back to the larvae, the eggs having been deposited on dead rats. Examination of flies from suspected surroundings should facilitate the location of dead rats under supplies of wheat or other goods. Other insects, such as beetles of the genera, *Dermestes* and *Hister*, are also of possible importance in this connection.

Hoffmann (W. H.). **Beobachtungen zur Biologie von** *Triatoma flavida*. [Observations on the Biology of *T. flavida*.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 1, pp. 159–163, 1 pl. Leipzig, 1925.

These notes on the biology of *Triatoma flavida*, Neiva, in Cuba, are based chiefly on breeding experiments in the laboratory [*cf. R.A.E.*, B, xi, 102].

Schuurmans Stekhoven Jr. (J. H.). **Vögel und Tabaniden.** [Birds and Tabanids.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 1, pp. 342–343. Leipzig, 1925.

Examinations in Java are described of the stomach-contents of a bird, *Bubulculus coromandus*, which occurs in swarms in the rice-fields and settles on the backs of oxen and buffalos, picking off insects, etc. One stomach contained 40 Tabanids, 5 Muscids and 1 locust, and another 17 Tabanids, 8 Muscids and 4 locusts. The Tabanids found were *Tabanus striatus*, F. (a vector of surra), *T. rubidus*, Wied., *T. ceylonicus*, Schin., *T. rufiscutellatus* (a new species, the description of which is being published elsewhere), and *Chrysops dispar*, F.

van Thiel (P. H.). **Beiträge zur Kenntnis der Trematoden aus** *Anopheles maculipennis*, **Meig.** [Contributions to the Knowledge of the Trematodes parasitising *A. maculipennis*.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 1, pp. 396–400. Leipzig, 1925.

Trematode larvae, *Agamodistomum anophelis*, have been found encysted in the body-cavity of *Anopheles maculipennis*, Mg., near Leiden [*R.A.E.*, B, x, 201], and further investigations have been made

to ascertain the final host. *Pneumonoeces variegatus*, obtained from the lungs of the frog, *Rana esculenta*, is probably the ultimate form of *Agamodistomum anophelis* and of *Cercaria anophelis*, the latter occurring in the snail, *Planorbis vortex*. It is evident that frogs are destroyers of mosquitos to a greater extent than hitherto believed.

WALCH (E. W.) & KEUKENSCHRIJVER (N. C.). **Ueber die Epidemiologie des Pseudotyphus von Deli.** [On the Epidemiology of Pseudotyphus in Deli.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 1, pp. 420–428, 4 figs., 1 pl. Leipzig, 1925.

Much of the information given here has already been noticed [*R.A.E.*, B, xiii, 84, 153]. *Trombicula deliensis*, owing to its geographical distribution and to its occurrence on rats and birds, is considered to be more dangerous than *T. schüffneri*. With one exception, when it was taken on a fowl, *T. schüffneri* has only been noticed on man.

RODENWALDT (E.) & ESSED (W. F. R.). **Untersuchungen über die Malaria in Tandjong Priok.** [Investigations into the Malaria at Tandjong Priok.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, Beiheft no. 4, 49 pp., 1 map, numerous charts. Leipzig, 1925.

Most of the information contained in this paper has already been noticed [*R.A.E.*, B, xiii, 147].

SENIOR-WHITE (R.). **A Revision of the Subfamily Rhiniinae in the Oriental Region.**—*Rec. Ind. Mus.*, xxvii, pt. 2, pp. 81–96, 2 pls. Calcutta, March 1925. [Received 23rd October 1925.]

This is Part iii of a general revision of the old family MUSCIDAE in the Oriental region, and deals with the subfamily RHINIINAE, which has apparently little or no economic status. Keys are given to the Oriental genera and species. *Pollenia pilisquama*, sp.n., is described from Ceylon.

HORVATH (G.). **Description of a New Bat-bug from India.**—*Rec. Ind. Mus.*, xxvii, pt. 3, pp. 191–192. Calcutta, May 1925. [Received 23rd October 1925.]

Macronella pattoni, sp.n., is described from an unidentified bat.

SURCOUF (J. M. R.). **Les Tabanides de France et des pays limitrophes.**—*Ency. ent.*, [A], 261 pp., 133 figs. Paris, Lechevalier, 1924. Price *Frs.* 55. [Received 17th October 1925.]

This work includes an account of the Tabanids found in France, Belgium, Luxemburg, Switzerland and Corsica. The systematic position of Tabanids is discussed, and their general structure and bionomics are described at length. Keys are given to the subfamilies, genera, subgenera, and species, with figures of each species dealt with, or at least of the distinguishing characters of each.

THOMPSON (H. W.). **A Test of the Tobacco Powder and Lime Mixture for the Destruction of Warble Maggots.**—*Welsh Jl. Agric.*, i, no. 1, pp. 200–201. Cardiff, January 1925. [Received 14th October 1925.]

During the spring of 1924, 6 herds of cattle in Glamorgan and Monmouthshire were treated with a dressing of 1½ lb. of fresh lime, 4 lb. of tobacco powder and 1 gal. of water, for the destruction of the larvae of warble-flies [*Hypoderma*]. The tobacco and lime were allowed to soak in the water for 24 hours; the liquid was then strained and applied to the backs of the cattle with a sponge. This was done carefully, to ensure that some of the liquid penetrated through the breathing hole and came in contact with the larva. Two applications were made at an interval of two or three days, the dressing being freshly prepared for each application. After two dressings about 90 per cent. of the larvae were killed on animals that were tied up, and another application, made about 3 weeks after the first, was sufficient to kill all of them. The results obtained indicate that if generally employed this method would reduce to a large extent the annual loss caused by these larvae.

It would probably be found possible to give several dressings between the beginning of March and the middle of May, as the operation takes up very little time.

GREVE (L.). **Versuche zur Bekämpfung der Dasselfliegenplage mittels Arzneimittel.** [Experiments in Combating the Warble Pest with Medicaments.]—*Deutsche Tierärztl. Wochenschr.*, xxxiii, no. 41, pp. 677–680. Hanover, 10th October 1925.

Experiments with a number of preparations are described for killing the young larvae of warble-flies [*Hypoderma*] in the skin of cattle as early as possible. They all proved unsatisfactory, with the exception of a naphthaline ointment, the formula for which is: Colophonium 1,300 gms., sebum 100, ol. jecoris 1,000, and naphthalin albiss. 600. The backs of the animals were clipped, and the ointment was first rubbed in hard and then spread somewhat more thickly. This treatment was as effective as the usual application of birch-tar oil, and is preferable because it is cleaner and has no bad effect on the skin. It is essential that the entire back be treated and that the applications be repeated every 8–14 days.

HUFF (C. G.). **The "Sun-ray" Structure in the Posterior Larval Spiracles of some Muscoid Flies (Diptera).**—*Ent. News*, xxxvi, no. 8, pp. 239–243, 4 figs. Philadelphia, Pa., October 1925.

The distribution of the bristles over the various groups of Muscoid larval spiracles is discussed, and the significance that they may have in the interrelations of these groups is being investigated, *Calliphora erythrocephala* being taken as fairly typical for the purpose.

BUXTON (P. A.) & HOPKINS (G. H. E.). **Race Suicide in Stegomyia.**—*Bull. Ent. Res.*, xvi, pt. 2, pp. 151–153. London, October 1925.

During an attempt in Samoa to analyse the factors that cause *Aëdes variegatus*, Dolesch., to lay its eggs in certain places and not in others, it was found that infusions of hay, rice or bran, diluted and

allowed to rot, are very attractive to this mosquito and also to *A. argenteus*, Poir. The addition of a poison killed the larvae after they hatched from the eggs, but did not make the infusion less attractive to the adults. In the experiments described four-gallon petrol tins, each with a hole 3 inches in diameter in its top, were used to cover the pots, as this apparently increased their attractiveness. The pots were of glass and contained about 500 cc. of liquid, the depth of which was about 1½ inches. The hay infusion was made by boiling grass in sufficient water to cover it. This was sterilised and, when required, diluted to about 20 times its volume with tap-water. A little primary sodium phosphate was added to neutralise the hay infusion, but there is no evidence that this made it more or less attractive. The alkaline hay infusion and arsenic consisted of hay infusion containing 0·05 per cent. of arsenious anhydride and sufficient N/10 sodium carbonate solution to make the pH approximately 10. The neutral hay infusion and copper sulphate consisted of hay infusion containing 0·1 per cent. of copper sulphate and sufficient N/10 sodium carbonate solution to neutralise it. Distilled water was used as a standard control, and this was renewed every week. The poisoned infusions proved as attractive as the plain hay infusion and kill the larvae within 2 days of hatching, usually in a few hours. The fluid must not be filtered, as much of the copper is precipitated, probably as a carbonate. This work is being continued in order to find, if possible, some fluid that will remain attractive for months, the minimum lethal percentage of poison required, and some efficient poison that would be less dangerous to animals and children.

Koidzumi (M.). **The Anophelines of Formosa.**—*Dobutsugaku Zasshi* [*Zool. Mag.*], xxxvii, no. 442, pp. 314–377, illus. Tokyo, August 1925. (In Japanese, with a Summary in English.)

At present 12 species of *Anopheles* are known to occur in Formosa, of which 9 have been identified. They comprise *A. hyrcanus*, Pall. (*sinensis*, Wied.), *A. pleccau*, Koidz., *A. minimus*, Theo., *A. candidiensis*, sp. n., *A. tessellatus*, Theo., *A. maculatus*, Theo., *A. splendidus*, Koidz., *A. hatorii*, Koidz., and *A. fuliginosus*, Giles. Descriptions are given of the larvae, pupae and adults of these species.

Rudolfs (W.). **Relation between Temperature, Humidity and Activity of House Mosquitoes.**—*Jl. N. Y. Ent. Soc.*, xxxiii, no. 3, pp. 163–169, 1 graph. Lancaster, Pa., September 1925.

Experiments similar to those made with *Aëdes* [*R.A.E.*, B, xii, 74] were carried out in 1924 with *Culex pipiens*, L. The results indicate a close relation between the numbers of mosquitos caught and atmospheric conditions such as temperature and relative humidity. This number is supposed to indicate the activity of the insects. The activity of *C. pipiens* is slight at temperatures below 70° F., but increases rapidly between 70 and 80° F. After 90° F. the activity decreases, until at 112–113° F. the mosquitos die. The reaction of mosquitos under laboratory conditions, with no chance of escape, corresponds with field observations. With regard to the relative humidity, the relation is positive up to 90 per cent., after which the activity seems to be accelerated up to about 95 per cent., followed by a sharp drop when the saturation point is approaching.

Bunker (C. W. O.) & Hirschfelder (A. D.). **Mosquito Repellents.**—*Amer. Jl. Trop. Med.*, v, no. 5, pp. 359–383. Baltimore, Md., September 1925.

The results of experiments with a large number of substances of known chemical composition as mosquito repellents are recorded in an extensive table. The method employed in the investigation was to smear one hand and arm with the substance to be tested, leaving the other bare; the subject then exposed both arms to the attacks of mosquitos, counting those that alighted and those that sucked blood on each in a given time. The mosquitos identified as present during the investigations included: *Culex fatigans*, Wied. (*quinquefasciatus*, Say), *Anopheles* sp., and *Psorophora* sp. at Hampton Roads, Virginia; and *Aëdes taeniorhynchus*, Wied., *A. bimaculatus*, Coq., *Culex* sp., and *Psorophora* sp. at Parris Island, South Carolina. For various reasons the arrangement of the substances in order of effectiveness proved exceedingly difficult, but a list of the 20 most efficient is given; in none of them was the boiling point below 150° C. (302° F.); the first 6, in order, are citronellol, caprylic alcohol, benzyl alcohol, geranyl acetate, linalyl acetate, and amyl salicylate.

In the course of the work in May and June 1922, adults of *Culex territans*, Wlk. (*restuans*, Theo.) and *Aëdes triseriatus*, Say, were reared from larvae in the laboratory. For the first week adults of both species emerged in abundance, subsequently almost solely the latter, possibly owing to the times of oviposition, but perhaps to the *Culex* larvae being eaten by the larger *Aëdes* larvae. The adult mosquitos were transferred to cages for testing repellents, but the experiments were unsuccessful owing to a failure to establish a control from which to calculate the relative values of the repellents, as the insects did not suck blood readily.

Chamberlain (W. P.). **Mosquito Control.**—*Rept. Health Dept. Panama Canal 1924*, pp. 12–14. Mount Hope, C.Z., 1925.

Anti-mosquito work for the past year is described. In the southern district, mosquito breeding along the shore of Miraflores Lake is now prevented by the use of a hot oil spray [*R.A.E.*, B, xii, 76], applied from a boat along the entire shore line, over 25 miles in extent, with a crew of 3 men, and at a cost of less than £50 a month for labour and materials. This compares favourably with a cost of £120 a month for treating only a small portion of the shore when other methods were employed. The shallow shore of the lake is a favourite breeding-place for *Anopheles albimanus*.

Edwards (F. W.) & James (S. P.). **British Mosquitoes and their Control.**—*Brit. Mus.* (*Nat. Hist.*), Econ. Ser. no. 4a, 27 pp., 4 figs. London, 1925. Price 6*d.*

The prevalence of mosquitos in England, especially on the South and East Coasts, has led various local authorities and voluntary workers to undertake control measures. As a knowledge of the species of mosquitos concerned and of their life-histories is essential for the success of such measures, the first part of this pamphlet includes brief descriptions of each of the 26 mosquitos hitherto found in Britain, with a rough key to the females based on characters visible to the naked

eye, or with a pocket lens. The distribution of all the species in Britain is given, with notes on the habits of those of importance.

The second part is devoted to measures for the control of mosquitos and protection against them. *Culex pipiens*, *Anopheles maculipennis* and *Theobaldia annulata* are most easily controlled by destroying the females passing the winter in buildings. In houses individual insects and small groups may be captured in several ways; in cellars and outhouses fumigation with sulphur (1 lb. to 1,000 cu. ft.) may be carried out, or, where this is undesirable, spraying may be employed. The following spray is recommended: Pyrethrum powder 2 lb., methylated spirit 1 gal., filter, and to the filtrate add safrol 1 gal., castor oil 1 oz., soap ½ oz; for use, dilute with 30 parts water. In severe winters when the insects are comatose they may be killed by lime-washing the walls. In dealing with those species of mosquitos that do not frequent houses anti-larval measures are necessary. In the case of the single-brooded species, such as the majority of *Aëdes*, these measures must be carried out between March and the end of April, and should consist of the treatment of all breeding-places with a larvicide such as cresol or some other preparation of dilute carbolic acid. With the double-brooded and multiple-brooded species, the measures may have to be repeated to kill the larvae of each generation. Measures against the first brood of *Anopheles bifurcatus*, which winters in the larval state, must be completed by the first week in February. Engineering works such as ditching and filling are necessary to control the salt-marsh mosquitos, *Aëdes detritus* and *A. caspius*. As mosquito destruction can only be carried out economically in restricted areas in England, repellents, to afford protection from bites, are important. No entirely satisfactory mosquito-repellent has yet been discovered, but the following are of some use: a 50 per cent. alcoholic solution of thymol or oil of cloves in lanolin; oil of cassia 1 part, brown oil of camphor 2 parts, lanolin 4 parts; citronella oil 1½ parts, kerosene 1 part, coconut oil 2 parts.

MARSHALL (J. F.). **Some Practical Notes on Mosquito Control.**—*Brit. Mosquito Control Inst.*, Circ. 16 [2nd edn.], 4 pp., 7 figs. Hayling Island, Hants. [1925.]

The first edition of this circular has already been noticed [*R.A.E.*, B, xiii, 124].

MARSHALL (J. F.). **Coastal Mosquitoes and their Control.**—[*Brit. Mosquito Control Inst.*,] 19 pp., 20 figs. [Hayling Island, Hants., 1925.]

A general account is given of the structure and habits of mosquitos, with some details on six species occurring in England. The importance of identifying the predominant species in any area where control measures are to be undertaken is pointed out, and the work of the British Mosquito Control Institute at Hayling Island is reviewed [*cf. R.A.E.*, B, xii, 132, etc.].

Fourth Report of the Hayling Mosquito Control. May 1924 to May 1925.—Fol., 8 pp., 7 figs. [Hayling Island, Hants, 1925.]

The work on the abolition of breeding-places of mosquitos in the different areas on Hayling Island is summarised. It has been directed

chiefly against the breeding-grounds of *Aëdes* (*Ochlerotatus*) *detritus*, Hal., *A.* (*O.*) *rusticus*, Rossi, and *Theobaldia annulata*, Schr.

The mosquitos have been greatly reduced, but to prevent any recurrence, it is essential that the surface-drainage channels, particularly those in direct communication with tidal water, shall be properly cleared every year. A large number of breeding-places have been located and abolished by the children's mosquito control class; this scheme has been in operation about a year and has given excellent results.

Nocht (B.). **Ueber Malariabekämpfung.** [On Malaria Control.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, no. 10, pp. 461–470. Leipzig, 15th October 1925.

These are some general considerations on anti-malarial measures in Dalmatia, Macedonia, Bulgaria, Rumania, Russia and Palestine, which countries were visited in 1924 and 1925 by the Malaria Commission of the League of Nations. Malaria was probably endemic in all of them prior to the war, and it is only when endemic malaria falls below the pre-war amount that the result can be ascribed to the measures taken; any other decrease may be due to the ebb of the post-war epidemic wave. Except in a few instances, such as in Panama, measures against mosquito larvae have not exhibited a real success in the control of malaria, though in the case of yellow fever conditions are more favourable. The Commission found only two regions where radical anti-larval measures had been applied and had yielded noteworthy results, namely in Palestine and in the Karst Mountains of Dalmatia. The conditions in both regions are suitable, and are so also in Macedonia, so that such work should be feasible and successful there. In Italy, the Balkans and Russia, anti-larval work on a large scale is not possible, owing to the cost and because geological and climatic conditions are unfavourable. The Commission recommends anti-larval measures only in specially selected regions, and then only after a careful survey of the technical and financial factors. Oiling, draining and the introduction of larva-destroying fish are a waste of money if done unsystematically. For the countries visited the Commission advises the search for all infected persons and their treatment; and the instruction of the population as to the transmission of malaria by Anophelines, and on methods for capturing and repelling them.

Martini (E.). **Zur Kulizidenfauna Südostrusslands.** [A Contribution to the Culicid Fauna of South-east Russia.]—*Arch. Schiffs- u. Trop.-Hyg.*, xxix, no. 10, pp. 514–518. Leipzig, 15th October 1925.

Anopheles maculipennis is very common throughout the Volga basin, where it is probably the only species responsible for malaria. Larvae were obtained of *A. bifurcatus*, which has not hitherto been found in the Saratov district. *A. hyrcanus* (*pseudopictus*) was not taken by the author, but is said to occur. Examples of *A. elutus* from Saratov are not positively distinguishable from *A. maculipennis*, and its specific validity is considered doubtful.

Culicines included *Theobaldia longiareolata* (*spathipalpis*); *Culex modestus*, of which there are two varieties in the adults, occurring from May to August; *C. torrentium*, which is common, especially in spring,

though a few larvae may still be found in August; *C. pipiens*, which breeds more readily in foul water than any other; *C. apicalis* (*sergenti*), a cold-water species found in springs, shaded pools, etc.; *Aëdes punctor meigenanus* (*nemorosus*); *A. salinus*, taken where salt occurs; *A. rostochiensis*, common in the forest region and on the wing in May and June; *A. leucomelas*, also flying in May and June; *A. maculatus* (*cantans*), the chief forest species; *A. annulipes* (*quartus*), which was rare, though probably more common in the north; *A. excrucians*, on the wing from May to July, rarely August, a dark form of it being common on the Volga islands; *A. freyi*, occurring sparingly in the forest region at the end of June; *A. lutescens* (*variegatus*, Schr.); *A. dorsalis*; *A. diversus*, or a closely allied species; *A. ornatus*, the larvae being common in mid-August; *A. vexans*, the most important species of this genus in the Volga islands and constituting a veritable plague in June and July; and *A. cinereus*, which is widespread, especially in June and July.

SWELLENGREBEL (N. H.). **De Malariabestrijding in Palestina.** [Malaria Control in Palestine.]—*Ned. Tijdschr. Geneesk.*, lxix, 2nd Half, no. 13, pp. 1422–1432. Amsterdam, 1925.

This is a brief account of malaria, mosquitos and anti-malarial work in Palestine [*R.A.E.*, B, xi, 69, 158; xii, 49, 85, 150; xiii, 143].

CHANDLER (A. C.). **The Transmission and Etiology of Dengue.—A Critical Review.**—*Ind. Med. Gaz.*, lx, no 10, pp. 460–462. Calcutta, October 1925.

This is a review of previous work on the subject of the transmission and causal organism of dengue.

The author is not inclined to agree with the theory that the disease is closely related to yellow fever, which is based on the fact that both diseases are transmitted by *Aëdes argenteus* (*aegypti*); but rather considers that the causal organism may be allied to that of sandfly fever, or even that only one organism may be involved, modified in its pathogenicity by development in mosquitos on the one hand and in sandflies [*Phlebotomus*] on the other. The view that the virus of dengue requires eleven days or more for development in the mosquito before transmission can occur is also not accepted by the author, who regards the rapidity of the spread of the disease as one of its outstanding features [*cf. R.A.E.*, B, xi, 143].

YORKE (W.). **Further Observations on Malaria made during Treatment of General Paralysis.**—*Trans. R. Soc. Trop. Med. & Hyg.*, xix, no. 3, pp. 108–122. London, October 1925.

The observations made during the past year indicate that simple benign tertian malaria, whether induced by inoculation of virulent blood or by the bite of mosquitos, is extraordinarily susceptible to treatment with quinine in patients suffering from general paralysis. The cases induced by mosquito bites are apparently very slightly less susceptible than the others.

McKenzie (A.). **Observations on Filariasis, Yaws and Intestinal Helminthic Infections in the Cook Islands with Notes on the Breeding Habits of** *Stegomyia pseudoscutellaris.*—*Trans. R. Soc. Trop. Med. & Hyg.*, xix, no. 3, pp. 138–149. London, October 1925.

This report is concerned chiefly with four of the Cook Islands, Rarotonga, Aitutaki, Mangaia, and Atiu. Filariasis, due to *Filaria bancrofti*, is general throughout the islands and is manifested in a variety of symptoms. The mosquitos recorded from Rarotonga are *Culex fatigans*, Wied., *Aëdes argenteus*, Poir. (*Stegomyia fasciata*, F.), and *A. variegatus*, Dolesch. (*S. pseudoscutellaris*, Theo.). After breeding these species from the egg, infection experiments were made. No living embryos were found in the thoracic muscles of *C. fatigans* after the third day. In *A. argenteus* living embryos were found on the fifth day, but many more appeared to be dead. By the tenth day a few embryos were found alive in two of the mosquitos, but by the eleventh day all those in the remaining individuals were dead. With *A. variegatus* complete development was obtained in 13 days, the adult filariae then migrating into the proboscis.

As a result of field observations and laboratory experiments, it has been ascertained that the eggs of *A. variegatus* are laid in any collection of water where there is protection from wind ; the usual breeding-places are in coconut husks, old tins, holes in trees, and any other small sheltered collection of water. Though sunlight is not absolutely fatal to the larvae, it retards their growth. They are almost omnivorous, and will thrive on all types of rotting vegetation. The complete life-cycle from egg to egg occupies 10 days ; under laboratory conditions the adults could not be kept alive for longer than 25 days. Over 200 mosquitos caught in the bush were free from filariae, whereas of those taken in houses in one case 2 out of 30 and in another 1 out of 20 were infected with filariae of several days' development. Greater infection occurs among men than women, and apparently more often in the plantations and poorer native huts than in the houses of the more wealthy natives. Anti-mosquito measures should be directed to clearing the ground of bush and old husks in the plantations and to keeping a clear space free from bush around the settlements.

Hirst (S.). **On a Harvest Bug (***Leeuwenhoekia australiensis*, **sp. n.) attacking Human Beings at Sydney, New South Wales.**—*Trans. R. Soc. Trop. Med & Hyg.*, xix, no. 3, pp. 150–152, 3 figs. London, October 1925.

Leeuwenhoekia australiensis, sp. n., which is described from the larva, attacks people working in gardens in New South Wales, and causes great irritation. The mites occur from October until April, and apparently show a preference for the more moist surfaces of the human body. This is the first record of a mite of this genus attacking man, and also the first record of the occurrence of the genus in Australia. The adult forms of the genus are unknown.

Bequaert (J.). **Report of an Entomological Trip to the Truxillo Division, Honduras, to investigate the Sand-fly Problem.**—*13th Ann. Rept. United Fruit Co., Med. Dept. 1924*, pp. 193–206. [Boston, Mass.] 1925.

As these observations were made at the driest time of the year it is possible that very different results might be obtained during the rainy

season. The sandflies found were *Culicoides furens*, Poey, and a species of *Leptoconops* or *Holoconops*. The latter is apparently a new species, and apart from the fact that the bite causes discomfort, it probably causes febrile conditions and seriously interferes with the health, particularly of infants. It is abundant along the edges of the mangrove swamps, especially towards the sandy sea-beach. It is very rarely seen indoors.

In the author's experience *C. furens* will not pass through the usual mosquito net, which has about 40 meshes to the inch. It attacks the bare skin, and for this purpose, will enter sleeves or work its way under the legs of trousers. It will fly as much as half a mile in search of man or animals on which to feed. It also probably enters the windows at the upper stories of houses. It does not show any preference for day or night, provided that the atmospheric conditions are suitable for it to be on the wing ; it appears to be most troublesome during calm periods, even the draught of an electric fan being enough to prevent its flying about a room. It only enters houses in order to obtain a blood meal, and the females have been found hiding in the shelter of dense vegetation, especially in the leaf-sheaths of coconut palms. The breeding places could not be traced, and it is believed that it breeds but rarely, if at all, during the dry months.

At the end of this paper a brief report is given of subsequent investigations by C. M. Winn, which indicate that the eggs of this sandfly are deposited in sandy soil and that moisture is essential for development. Within a few hours of digging holes 18 inches deep into the moist stratum, large numbers of sandflies would fly around and away from the opening. The eggs may also be deposited in brackish water.

The individuals that bite in the dry season are probably females that have succeeded in surviving the drought as adults. The only practicable remedial measures are the abolition of breeding-grounds and the individual prevention of biting. The latter includes the use of nets, possibly chemical repellents and, where practicable, artificial air currents produced by electric fans. This last method is, perhaps, the best for the protection of children.

The mosquitos recorded from various localities of Honduras are *Psorophora lutzi*, Theo., *P. ferox*, Humboldt, *Aëdes euplocamus*, D. & K., *A. taeniorhynchus*, Wied., *A. trivittatus*, Coq., *Taeniorhynchus* (*Mansonia*) *titillans*, Wlk., *Sabethes cyaneus*, F., and *Megarhinus superbus*, D. & K.

A species of *Trombicula* is abundant in many localities of Honduras at certain seasons. It occurs in pastures and waste places covered with ank weeds. On man and animals the larva causes considerable rrritation, but though it may feed on the skin for some time and eventually enter a hair follicle or sebaceous gland, it dies eventually ias it is unable to complete its development except on insects.

The larvae of *Amblyomma cayennense*, F., readily attack man in Honduras. Blood-sucking Diptera include *Chrysops costata*, F., the most prevalent Tabanid, which attacks horses, but rarely man ; *Lepidoselaga crassipes*, F., occurring along the banks of the streams ; *Esenbeckia prasiniventris*, Macq. ; *E. ferruginea*, Macq. ; *Diachlorus ferrugatus*, F. ; *Dichelacera grandis*, Ric. ; *Tabanus mexicanus*, L., which is of distinctly crepuscular habits ; *T. appendiculatus*, Hine ; *T. carneus*, Bellardi ; *T. lineola*, F. ; *T. subruber*, Bellardi ; *T. defilippii*, Bellardi ; *T. albonotatus*, Bellardi ; *T. littoreus*, Hine ; and *Stomoxys calcitrans*, L.

EDWARDS (F. W.). **A Midge attacking Moths in Switzerland.**—*Ent. Mo. Mag.*, lxi, pp. 228–229. London, October 1925.

A midge, recorded as feeding on various moths in Switzerland, appears to be structurally identical with *Forcipomyia* (*Euforcipomyia*) *papilionivora*, Edw. [*R.A.E.*, B, xi, 107], though lighter in colour.

FRANÇA (C.). **Notes parasitologiques.**—*Jorn. Sciênc. mat., fis. & nat.*, 3rd Ser., no. 17, separate, 12 pp. Lisbon, 1924. [Received 2nd November 1925.]

With reference to the doubts that have been expressed as to the definitive character of *Herpetomonas* (*Leptomonas*) *davidi*, the author considers that the plant latex is merely a cultural medium, and that the specific determination of the protozoa must depend on the forms in the Rhynchota, which are the primitive hosts. Different species of protozoa may be quite indistinguishable in the latex, owing to convergence caused by the identity of the media in which they occur; consequently it will doubtless be found eventually that several different species have been included under the name *H. davidi*.

In view of the fact that the subgeneric name *Lutzia* previously proposed by the author for *Phlebotomus longipalpis*, Lutz & Neiva [*cf. R.A.E.*, B, x, 50] is pre-occupied by *Lutzia*, Theo., in mosquitos, the new name *Lutzomyia* is proposed. The synonymy of *P. argentipes*, Ann. & Brun. (*annandalei*, Sinton) is discussed [*cf. R.A.E.*, B, xiii, 123].

Tsetse Fly in Zululand.—*Jl. Dept. Agric. Union S. Africa*, xi, no. 4, pp. 289–290. Pretoria, October 1925.

Further experiments have been carried out by R. H. Harris in Zululand regarding the use of dummy animals to attract *Glossina* [*R.A.E.*, B, xi, 157; xii, 19]. It was found that tsetse-flies could be captured at a stuffed bushbuck standing in the open 200 yards from the bush, or at a dummy donkey 900 yards from the bush. The bushbuck was quite unattractive to flies when covered with white muslin, except when placed in the bush where flies were present. An artificially-constructed patch of bush proved an additional attractant, at least while kept fresh and green. A bush-pig in a recumbent position did not seem to be highly attractive, but when raised on short legs, flies came to the legs. With a sack dummy placed on legs 5 ft. long, flies came to the legs and belly; at 6 and 8 ft. the legs only were attacked, and at 10 ft. there were no captures on certain days. It is expected that a limit or zero point will be reached when the fixed focal range of the fly fails to encompass the picture of an animal due to the distortion caused by the very long legs. The indications are that the fly has a fairly constant level of flight, which might well be regulated and limited by the visionary and focal range capacity of the eye of the insect to encompass the size of the object encountered. Thus a long-legged dummy, which might have attracted at the limit of the visionary range, would perhaps lose its attractiveness on nearer approach through failure of the eye to take in the whole picture.

The Tsetse-fly Problem and its Solution.—*Soc. Preserv. Fauna of the Empire*, Occas. Paper no. 1, 10 pp., 1 map. London, October 1925.

This memorandum discusses the fallacy of game extermination as a means of suppressing tsetse-flies [*Glossina*] in Africa, and points

out that the newest methods of attacking the fly problem, which include systematic attacks on the important elements in the bush by means of the local native population and organised late burning of grass, offer a much greater hope of success [*R.A.E.*, B, xiii, 105, etc.].

Operations against Tsetse Fly.—*Rhodesia Agric. Jl.*, xxii, no. 6, pp. 634–635. Salisbury, September 1925.

The Government has authorised and subsidised a scheme in the Lomagundi district for the creation of a barrier between the farms and the zone occupied by tsetse-fly [*Glossina morsitans*], by fencing in an area, 30–35 miles long and 10 miles wide, between two rivers, and driving out the game as the fencing is erected. The ground gained is to be consolidated temporarily by camps to prevent the game returning. It is not certain whether the tsetse-flies occasionally seen and caught in the occupied farms are actually established there or whether they are wanderers from the definitely infested country. If the fly is found to be established in any part of the occupied side of the barrier in Lomagundi, the necessary steps for its eradication will be taken. The area to be fenced this year does not include much of the definite fly area, but with the removal of the larger game it is hoped to eliminate any fly that may be there, aided by the late and organised burning of grass. Native cattle are to be removed and the movements of natives in reference to the barrier controlled to some extent.

Bevan (Ll. E. W.). **Notes from the Veterinary Laboratory.**—*Rhodesia Agric. Jl.*, xxii, no. 7, pp. 740–744. Salisbury, October 1925.

The history of the discoveries regarding East Coast fever and the relation of ticks to it, and the application of systematic dipping as a means of control are reviewed.

Shaw (R. K.). **The Destruction of Rat-fleas by Heat on Board Ship.**—*Jl. R.N. Med. Serv.*, xi, no. 4, pp. 255–260. London, October 1925.

Experiments, conducted in the spring of 1925 in H.M.S. *Endeavour* to discover a method of destroying rat-fleas in clothing and bedding, showed that all rat-fleas can be destroyed in a dry blanket (not more than twice folded) if exposed in the engine room to a temperature of 110° F. for 3 hours, but that fleas are able to withstand a high temperature for a prolonged period if kept moist.

Hirst (L. F.). **Report of the Municipal Bacteriologist for 1924.**—*Colombo: Rept. Med. Off. Health, 1924*, pp. 68–79, 2 pls., 3 maps. Colombo, 1925.

An extensive flea survey of Colombo was carried out during 1922, 1923 and 1924, in the course of which 3,276 rats were searched and 10,789 rat fleas collected. Separate figures regarding *Mus* (*Rattus*) *rattus* and *M.* (*R.*) *norvegicus* are given, with particulars of the human plague incidence in relation to the percentage of *Xenopsylla cheopis* among the total rat fleas prevalent in the 14 inhabited districts. The relationship between the local distribution of premises infested with *X. cheopis* and those infected with rat or human plague is illustrated

by a map showing the local incidence of *X. cheopis* on *M. rattus* and on *M. norvegicus*. The latter predominates in the old system of Dutch drains lying beneath the endemic plague area. The author has recently found *X. cheopis* on a shrew, *Pachyura coerulea*, which is known to be a reservoir of plague fleas in French Indo-China.

A long series of experiments on the transmission of plague from rat to rat by means of *X. astia* and *X. cheopis*, begun in 1915, has now been concluded, and the results of the whole series are briefly summarised as follows: Attempts to transmit plague between rodents have been carried out with 596 *X. astia* in the course of thirteen experiments during four plague seasons at room temperature in the laboratory. The results were entirely negative. Under similar conditions, 132 *X. cheopis* transmitted plague to 12 rodents in the course of six separate experiments. Plague has been transmitted from rat to rat by means of *X. astia* in one experiment carried out at an artificially reduced temperature in a transmission chamber surrounded by a mixture of ice and sawdust. One infective *X. astia* was found to be typically "blocked" and exhibited the phenomenon of oesophageal regurgitation described by Martin and Bacot. Two other experiments on the same lines gave negative results. In other words, *X. astia* may carry plague to rats under climatic conditions favourable to plague transmission. Contrary to expectations, plague was continuously transmitted to a series of rats in succession by the same batch of infected *X. cheopis* at room temperature during March 1924, under climatic conditions particularly unfavourable to plague transmission. It is comparatively easy to obtain a heavy growth of plague bacilli in the stomach of *X. astia* fed upon infected rats. There is evidence, however, that blocked *X. astia* have relatively low vitality and bite rats feebly at tropical temperatures. No evidence has yet been obtained of any marked difference in the virulence of *Bacillus pestis* after growth in the stomach of *X. astia* and *X. cheopis* respectively.

A survey of the Customs premises and Government granaries has shown that the percentage of *X. cheopis* found on rats there is much higher than elsewhere; in fact, there is evidence that this species is an imported flea developing principally in the vicinity of grain stores, its distribution in the endemic plague area being assisted by the presence of the system of underground, untrapped drains. The very important question, therefore, arises whether the disinfection of the imported grain (a measure that has been strongly advocated on other grounds) would eradicate plague from Colombo. Further research into the bionomics of rat fleas is required before this can be definitely determined; in particular it must be decided whether the *X. cheopis* already present can withstand the unfavourable conditions of the Colombo hot weather. If continual fresh importations of the flea could be prevented and the old drainage system completely abolished, a series of hot weathers with deficient rainfall might lead to the gradual disappearance of *X. cheopis* and of plague from its present foci. In Colombo, plague diminishes when the mean temperature of the atmosphere rises above 80° F., and the effects of climate differ in degree according to the species of rat flea. The indications are that *X. cheopis* is not so well adapted to the Colombo climate as *X. astia*. The latter has been successfully bred in the laboratory on *M. rattus*, *M. norvegicus*, *M. dubius* and guineapigs [*cf. R.A.E.*, B, xi, 187, 216; xiii, 13].

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